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INTEROPERABILITY MANAGEMENT
PLAN



MARCH 1987



DEPARTMENT OF THE NAVY
HEADQUARTERS UNITED STATES MARINE CORPS
WASHINGTON, D.C. 20380

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CCA-10

5 MAR 1967

From: Commandant of the Marine Corps

Subj: MARINE CORPS INTEROPERABILITY MANAGEMENT PLAN (SHORT
TITLE: IMP)

Ref: (a) MCO 3093.1A (NOTAL)
(b) MCICMP

Encl: (1) Marine Corps Interoperability Management Plan (IMP)

1. The Marine Corps Interoperability Management Plan at enclosure (1) has been developed to implement the policies and procedures contained in reference (a). As such it will be identified in future revisions to reference (a) as the principal management tool for ensuring interoperability and intraoperability of tactical data systems.

2. The enclosure establishes detailed guidance and procedures for the implementation of Marine Corps interoperability/intraoperability standards and it establishes a formal process for the submission, evaluation, and approval of proposed changes to developmental and operational interfaces. It provides the overall framework for implementing reference (b) and, in addition, it provides procedures for managing Marine Corps participation in the joint/allied Configuration Management (CM) processes.

3. This plan is a configuration item that is to be managed under the procedures defined in the enclosure. All recommended changes are to be forwarded to CG, MCDEC (D101) for processing, with an information copy to CMC (CCA).

R. R. PORTER

Director, Command, Control, Communications
and Computer (C4) Systems Division

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Subj: MARINE CORPS INTEROPERABILITY MANAGEMENT PLAN (SHORT
TITLE: IMP)

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MARINE CORPS
INTEROPERABILITY MANAGEMENT PLAN
(IMP)

MARCH 1987

INTEROPERABILITY MANAGEMENT PLAN

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INTEROPERABILITY MANAGEMENT PLAN

CHAPTER 1

INTRODUCTION

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INTEROPERABILITY MANAGEMENT PLAN

CHAPTER 1

INTRODUCTION

1000. PURPOSE. The overall objective of the Interoperability Management Plan (IMP) is to ensure the exchange of critical tactical information in Marine Corps combat operations through Marine Corps interoperability management. Interoperability occurs at two levels: first, between and among Marine Corps operational facilities (sometimes referred to as intraoperability) and second, between Marine Air Ground Task Forces (MAGTFs) and joint or combined commands. Continuous information exchange on both levels is critical to effective command and control and successful achievement of assigned operational missions. Towards that end, the plan refines existing Marine Corps interoperability management and acquisition responsibilities and centralizes procedures for interoperability management activities. These procedures aim to accomplish the following:

- o Identify the manner in which existing and new interoperability requirements and standards are identified, defined, standardized, and documented.
- o Facilitate the implementation, verification, testing, and certification of those standards on developing tactical data systems (TDSs) and interconnecting equipment.
- o Prescribe coordination between the various configuration management bodies and activities that control modifications to requirements, standards, TDSs, and interconnecting equipment.
- o Ensure that interoperability program requirements are adequately planned for and funded.

1001. SCOPE

1. Background

a. General. Marine Corps Order (MCO) 3093.1B, Intraoperability and Interoperability of Marine Corps TDSs and Interconnecting Equipment (reference (a)), establishes policy to ensure that only approved Marine Corps or joint interoperability standards are implemented in USMC TDSs and interconnecting equipments. Implementation of interoperability requirements and standards in Marine Corps systems is overseen by the Tactical Systems Inter/Intraoperability Program (TACSIIP).

b. Role of Doctrine. Joint, combined, and Marine Corps operational concepts are the foundation for all interoperability requirements within the Marine Corps. Command and Control (C²) doctrine is contained in various Fleet Marine Force Manuals (FMFMs), Marine Corps developmental manuals/bulletins (DM/Bs), Naval Warfare Publications (NWP), Field Manuals (FMs),

Allied Tactical Publications (ATPs), and other joint/combined doctrinal publications. Doctrine is influenced over time by changing threats and technology; these doctrinal changes generate new operational requirements.

c. The C² System. The Marine Corps C² system is comprised of operational facilities (OPFACs), equipment, communications, procedures, and personnel that enable commanders to plan, direct, and control the operations of their forces. The specific structural arrangement of these elements depends on the nature of the assigned mission. Chapter 3 provides additional details about the information exchange within the C² system. Note that a C² system is not a tactical data system but rather a C² system may be supported by TDSs.

d. Interoperability Requirements and Standards Definition. Mission Area Sponsors conduct Mission Area Analyses (MAAs) to identify operational needs and define the operational requirements to meet those needs. These operational requirements give rise to interoperability requirements; interoperability standards are then developed to satisfy requirements. Marine Corps interoperability requirements are documented in the U.S. Marine Corps Technical Interface Concepts (TIC) (reference (b)) and must be stated in individual system/equipment required operational capabilities (ROCs). Interoperability standards are generally categorized as message, protocol, and data standards, and must be specified in system/equipment specifications. Finally, interoperability requirements and standards are implemented in hardware and software; firmware is treated as software in accordance with DoD STD-2167.

(1) Message Standards. Message standards are message formats, formatting rules and conventions, and acknowledgement instructions, and are supported by data standards. Message standards are specified in USMC, other Service and Joint Technical Interface Design Plans (TIDPs), Joint Chiefs of Staff (JCS) Publications, and various North Atlantic Treaty Organization (NATO) Standardization Agreements (STANAGs).

(2) Protocol Standards. Protocols establish the procedural rules that allow TDSs and interconnecting equipment to exchange information. They provide conventions for establishing physical transmission paths, activation and control of data links, recovery from errors, procedures for interchange of information between networks, and rules for users to interface with a data communications network. Protocol standards are those conventions and procedures that are applied to the design and development of TDSs and interconnecting equipment to ensure their interoperability. Protocol standards are documented in Department of Defense/Military Standards (DoD/MIL-STDs), the Technical Interface Design Plan for Marine Tactical Systems, Tri-Service Tactical Communications (TRI-TAC) performance specifications and, for Marine Corps-unique equipment, functional or product specifications, in accordance with MIL-STD-490A.

(3) Data Standards. Data standards provide a dictionary of common data items and prescribe the manner in which these items of data are represented

when specified in message and protocol standards. Data standards are contained in NATO Allied Data Publications (ADatPs), Message Element Dictionaries (MEDs) and Data Element Dictionaries (DEDs), JCS Publications, DOD/MIL-STDs, and interface specifications.

e. Standards Implementation and Verification. Interoperability standards must be appropriately implemented (specified) through contracting offices in both principal development activities (PDAs) and Headquarters Marine Corps (HQMC). System developer and equipment supplier statement(s) of work (SOW), contract data requirements lists (CDRLs), special provisions and specification(s)/drawing(s) all must accurately reflect Marine Corps or joint interoperability requirements and standards. The acquisition coordinating group (ACG) together with the PDA must ensure that contract provisions are accurately stated, appropriately costed, and strongly enforced.

f. Interoperability Testing and Certification. Once interoperability standards are imposed on systems and equipment, testing must be performed to verify that the equipment meets the standards' form, fit, and function requirements. If they do, the equipment or system may be certified for use on Marine Corps, joint, or combined interfaces, as appropriate. If the standards are not met, then deficiencies must be corrected and retested. Throughout the remainder of the equipment life cycle, as changes occur to the equipment or the standards, retesting must also be performed.

g. System, Equipment, and Standard Modifications. Changes in the enemy threat, technology, doctrine, systems, equipment, and new operational and/or information requirements will force modifications upon developing or fielded equipment and published standards. Continuing configuration management mechanisms must plan for, effectively program, and implement these changes to ensure continued interoperability throughout system life cycles.

2. Current Interoperability Problems. The following interoperability problems are neither prioritized nor exhaustive, but are included to emphasize the need for interoperability management improvements.

a. Increase in Tactical Data Systems. Concurrent with the increase in data acquisition capabilities, the number of tactical data systems being acquired or planned for use in the tactical environment is increasing. Improper planning and implementation of interoperability requirements and standards in the future will be prohibitively expensive.

b. More Sophisticated Electronics Environment. The advent of digital communications and other technological improvements, including lasers, satellites, spread spectrum, and frequency-hopping techniques will result in more reliable, secure communications capabilities, but at significantly higher costs. Likewise, increases in the type and quantity of communications (voice, data, video, graphics) and enemy electronic warfare capabilities require proper management attention in all phases of acquisition. Marine Corps programs, such as TACSIIP and the Marine Corps Integrated Communications Support (MCICS), need to be closely coordinated with Marine Corps participation in other service and

joint programs such as the Position Location Reporting System (PLRS), Joint Tactical Information Distribution System (JTIDS), and Joint Interoperability of Tactical Command and Control Systems (JINTACCS) to prevent waste and misguided efforts.

c. Nature of Marine Corps Missions and Procurements. The Marine Corps is the smallest service and yet, because of its worldwide missions, has as many joint and allied interoperability requirements as the other, larger services. In addition, Marine Corps interoperability management is complicated by the fact that it has a greater dependency on other service procurements for its equipment and systems acquisition process. Likewise, budgetary constraints and affordability considerations significantly affect all Marine Corps programs.

d. Fragmentation of Acquisition Program Sponsor Responsibilities. The allocation of mission area/acquisition program sponsorship, in accordance with MCO P5000.10_, Systems Acquisition Management Manual (reference (c)), causes management attention to focus inward, within a mission area or system, rather than across mission area boundaries. As a result, interoperability and other interface requirements tend to be de-emphasized or deferred as development programs evolve. This results in significant development, testing, cost, and risk, thus having an impact on the transition effort from development to production.

e. Complexities of Joint and Allied Standards Development. The organizational and procedural aspects of joint and allied equipment and message/data standardization programs are sufficiently complex to overwhelm the average staff officer and coordination of standards is very slow.

f. Information Management Problems. The sheer volume of information needed to intelligently manage the interoperability problem is also overwhelming. The vast numbers of equipments, data items, messages, data links, and systems require automated data base support for key managers and staff analysts. Likewise, the need to provide and periodically update system PDAs, contractors, and equipment vendors with interoperability information makes manual documentation preparation and handling impractical.

3. Interoperability Management Objectives and Approach. This plan consolidates and defines Marine Corps organizational responsibilities and prescribes procedures for each of four interoperability management activities, which are discussed below.

a. Interoperability Planning. This activity includes the setting of interoperability policies, goals and objectives, implementation of this plan and appropriate programming of funds through the Planning, Programming, and Budgeting System (PPBS) process to ensure that program-required resources are available, when and as needed. Chapter 2 discusses policies, chapter 8 addresses PPBS procedures, and chapter 9 lists interoperability planning responsibilities.

b. Interoperability Requirements and Standards Definition. This activity involves the design, development, and documentation of interoperability requirements and standards. The tools of this activity are an interrelated set of documents and data bases. Chapter 3 describes the tools and their use in identifying interoperability requirements, standards, and specifications.

c. Interoperability Implementation, Verification, Testing, and Certification. Interoperability implementation activities include those associated with the application and tailoring of specific interoperability requirements, standards, and specifications to individual TDS and interconnecting equipment contracts. It also includes identifying interoperability requirements not satisfied by any standards, systems, or equipment and initiating efforts to meet those requirements. This process includes prescription of the appropriate contract data requirements, provision of these standards and specifications as government-furnished information (GFI), inclusion of contractor procedures for submission of waivers and change proposals, requirements for contractor participation in Interface Control Working Group (ICWG) and Interoperability Technical Review Group (ITRG) activities, and imposition of appropriate contractor testing requirements as a part of the overall interoperability testing and certification process. The implementation process also includes responsibilities and procedures for Marine Corps monitoring and supervision of contract execution of interoperability requirements. Chapters 4, 5, and 6 present these procedures; chapter 9 addresses responsibilities.

d. Interoperability Configuration Management (CM). As interoperability requirements and standards are implemented and certified, they must be brought under strict configuration management. This process is complicated by the fact that some items are configuration managed by other (lead) services, with only Marine Corps participation. The Marine Corps Interoperability Configuration Management Plan (MCICMP) (reference (d)) addresses current requirements for CM of interoperability requirements and of message, data, and protocol standards. Chapter 7 presents CM requirements and procedures and chapter 9 addresses CM responsibilities.

1002. AUTHORITY. This plan was directed by Chief of Staff letter 3000 over CS dated 31 July 1984, Interoperability of Marine Corps Tactical Data Systems, (reference (e)) and implements a comprehensive interoperability management structure and program that supports the policies of MCO 3093.1B.

1003. ORGANIZATION. This plan is organized in nine chapters, including this introduction. Chapter 2 contains DoD, joint, allied, and Marine Corps policies and programs for interoperability management. Chapter 3 describes the C² architecture and a methodology for identifying, developing, and defining interoperability requirements and standards. Chapters 4, 5, and 6 describe procedures for the implementation, verification, testing, and certification of interoperability requirements and standards. Chapter 7 discusses configuration management procedures for modifying and maintaining existing joint, allied, and

Marine Corps interoperability requirements and standards. Chapter 8 describes procedures for ensuring that program cost planning and budgeting activities support Marine Corps interoperability management goals and objectives. Chapter 9 lists interoperability responsibilities for various organizations and individuals involved in systems acquisition.

1004. REFERENCES. See Appendix A.

1005. GLOSSARY. Appendix B contains a glossary of terms used in this plan.

1006. APPLICABILITY. This plan is applicable to all organizations involved in interoperability planning, definition, implementation, verification, testing, certification, and configuration management for Marine Corps TDSS and interconnecting equipment.

1007. CHANGES. Recommended changes to this document shall be forwarded to the Commandant of the Marine Corps (CMC) (CCA), Headquarters, U.S. Marine Corps, Washington, D.C. 20380-0001 with an information copy to Commanding General, Marine Corps Development and Education Command (MCDEC) (D101), Quantico, Virginia 22134-5080.

INTEROPERABILITY MANAGEMENT PLAN

CHAPTER 2

POLICIES AND PROGRAMS

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INTEROPERABILITY MANAGEMENT PLAN

CHAPTER 2

POLICIES AND PROGRAMS

2000. INTRODUCTION. The need for interoperability of tactical data systems and interconnecting equipment is present at all levels throughout the Department of Defense from the Secretary of Defense to the user/operator. To ensure that interoperability is achieved, the various levels of command authority have defined interoperability policies and established programs to manage them. Policies and programs pertinent to the life-cycle management of interoperability for Marine Corps tactical data systems and equipment are addressed in this chapter.

2001. DEPARTMENT OF DEFENSE

1. Policy. DoD Directive 4630.5, Compatibility and Interoperability of Tactical Command, Control, Communications, and Intelligence Systems (reference (f)), states it is DoD policy "to develop, acquire, and deploy tactical command, control, communications and intelligence (C³I) systems and equipment that effectively meet the essential operational needs of the U.S. tactical forces, and that are compatible and interoperable, where required, with other U.S. tactical C³I systems and equipment, with allied tactical C³I systems and equipment, and with U.S. nontactical C³I systems and equipment. The degree of necessary interoperability shall be determined during the requirements validation process and shall be ensured through the acquisition process, deployment, and operational life of the system or equipment." The latter requires each service to provide copies of tactical C³I system/equipment requirements documents to the Joint Tactical Command, Control, and Communications Agency (JTC³A) and other services and agencies, and to review same. CMC (RD) is responsible for dissemination of Marine Corps requirements documentation; CMC (CC) is responsible for reviewing other service C³I requirements and acts as the USMC point of contact for all review actions.

2. Programs

a. A number of programs and projects have been initiated by defense department organizations to facilitate implementation of DoD interoperability policy. These programs and projects, although affecting all components of the defense establishment, are managed by the JTC³A, the Military Services, and the Defense Agencies rather than by the DoD itself, and are addressed at appropriate places in this plan.

b. DoD has established the Command, Control, and Communications (C³) Review Council, a senior-level (flag officer) forum for resolving significant C³ issues, including compatibility and interoperability, by Deputy Secretary of Defense Memorandum, Charter for C³ Review Council, (reference (g)). The

Director, Command, Control, Communications, and Computer (C⁴) Systems Division, CMC (CC), is the Marine Corps representative to this council.

2002. JOINT CHIEFS OF STAFF

1. Policy. It is JCS policy that the military forces of the United States must possess the compatibility and interoperability necessary to ensure success in joint and combined operations. Elements critical to achievement of this goal are compatibility and interoperability of tactical C³I systems. It is also JCS policy that interoperability and compatibility be certified for use in joint and combined operations by testing systems and their interfaces to verify proper implementation of necessary interoperability standards. Systems with joint or combined interfaces that fail certification will be modified and retested until certification is achieved. These interfaces will not be employed in joint or combined operations until certified.

2. Programs

a. The JCS is charged, by the Secretary of Defense, with establishing procedures for the development, coordination, review, and validation of interoperability requirements for joint or combined tactical C³I systems and equipment. Additional interoperability responsibilities are assigned to the JCS which relate to evaluating doctrine, certifying interoperability, validating requirements, and providing guidance and direction for configuration management of the C³I systems, equipment and standards.

b. JCS Memorandum of Policy (MOP) 160, Compatibility and Interoperability of Tactical Command, Control, Communications and Intelligence Systems (reference (h)) reflects procedures and responsibilities needed to implement DoD and JCS policy relating to compatibility and interoperability. This MOP addresses all aspects of tactical C³I compatibility and interoperability, such as doctrine and concepts, operational procedures, requirements processing, development of interoperability standards, systems acquisition, testing, verification and certification, and equipment life-cycle management and training. It further establishes an improvement program for tactical C³I compatibility and interoperability. CMC (CC) provides the Marine Corps representatives to the screening and priority boards under this program. The goals of this Tactical C³I Interoperability Improvement Program are to:

(1) Identify, coordinate, prioritize, and resolve current interoperability issues.

(2) Identify and prioritize Commander-in-Chief (CINC) interoperability needs and requirements.

(3) Prioritize funding for joint tactical C³I programs and coordinate funding for tactical C³I programs with identified interoperability requirements.

(4) Coordinate tactical C³I systems (to include Communications Security (COMSEC)) fielding plans.

(5) Identify and prioritize requirements for interoperability standards and for the resources to develop these standards in a timely manner.

2003. JOINT TACTICAL COMMAND, CONTROL, AND COMMUNICATION AGENCY

1. Policy. The Director, JTC³A carries out the stated DoD policy for interoperability by ensuring the interoperability of tactical C³ systems for joint or combined operations through the development and maintenance of a joint tactical C³ architecture, interface standards, and interface definitions for tactical/mobile C³ systems.

2. Programs. As directed by the Secretary of Defense in reference (f), the Director, JTC³A is responsible for the performance of the tasks specified in DoD Directive 5154.28, Joint Tactical Command, Control, and Communications Agency (JTC³A), (reference (i)). These tasks encompass the development and maintenance of a joint tactical C³ architecture and the planning, programming, development, testing, evaluation, implementation and configuration management activities that comprise the interoperability program. In addition, the Director, JTC³A, is assigned the specific responsibility for developing and conducting a tactical C³I systems interoperability testing and certification program to verify proper implementation and maintenance of joint/allied interoperability standards. In order to carry out its mission, JTC³A manages the following programs:

a. Joint Tactical Air Operations (JTAO) Interface Program. The JTAO Interface Program succeeded the Tactical Air Control Systems/Tactical Air Defense Systems (TACS/TADS) Interface Program in 1981. The TACS/TADS program was initiated in 1969 as a multiservice and agency program to achieve compatibility and interoperability of existing deployable air control and air defense systems supporting tactical air operations. The interface, which was successfully demonstrated in 1977, is accomplished through the use of tactical digital information links (TADILs) A, B, and C. In January 1983, responsibility for JTAO configuration management testing was assumed by the Joint Interoperability of Tactical Command and Control Systems Program. Management responsibility of the JTAO Program was assumed by JTC³A when it was established in 1984.

b. Joint Interoperability of Tactical Command and Control Systems. In July 1984, the JTC³A was established and was assigned responsibility for managing the JINTACCS Program created by JCS in 1977. The purpose of the JINTACCS Program is to achieve interoperability and to enhance the operational effectiveness of selected operational facilities and supporting tactical command and control systems of the military services and agencies in joint operations. The JINTACCS Program includes two major developing message standards, the Message Text Format (MTF), and the Tactical Digital Information Link J (TADIL J) standards. The JINTACCS Program is also responsible for

assisting in the achievement of interoperability of U.S. tactical command and control systems in NATO.

c. Tactical C³I Configuration Management. JTC³A Circular 9000, Tactical C³I Configuration Management (reference (j)) establishes policy, procedures, and responsibilities for the implementation of a tactical C³I configuration management program applicable to the documentation of technical and procedural interfaces employed in joint or combined operations. The circular addresses those procedures by which changes to the technical and procedural interface configuration items under the responsibility of the JTC³A are accomplished and how new documentation is introduced into the configuration management system. Included in the configuration management process are interface design standards, message standards, interface specifications, system interface specifications, interface control documentation and the Joint Tactical Command, Control, and Communications - Central Data Base System (JTC³-CDBS), which supports the joint tactical C³ architecture.

d. Interoperability Certification of Tactical C³I Systems and Equipment. The JTC³A, by reference (i), has the responsibility for appropriate testing of joint and combined tactical C³I interfaces. To implement this responsibility, an interoperability certification program was established by JTC³A Circular 9002, Interoperability Certification of Tactical C³I Systems and Equipment Interfaces (reference (k)). This program establishes policy and responsibilities for an interoperability certification program that addresses tactical C³I system technical and procedural interfaces as they apply to tactical C³I systems and equipment employed in joint (two or more services/agencies) or combined (U.S. and allied) interfaces. In regards to intelligence systems, the circular applies to the interfaces between tactical C³I systems and either tactical or nontactical intelligence systems, and to the interfaces between those communications systems that support intelligence systems. JTC³A Circular 9002 regards joint or combined interfaces as referring to C³I systems/equipments that interface and/or integrate with one another and are operated by different services/agencies and/or by a component and an allied agency. It does not apply to interfaces with the same service operating both sides of the interface; these interfaces are a single service responsibility.

e. Coordination of TADIL J Interface Management Plan. TADIL J is an information link comprised of Joint Tactical Information Distribution System (JTIDS) communications equipment, bit-oriented J-series messages, protocols, and interface operating procedures designed to satisfy operational requirements for information exchange in the tactical, near-real-time environment. The JCS assigned the responsibility for development and management of the TADIL J message standard to the Executive Agent for JINTACCS, currently the JTC³A. JTC³A Circular 9003, Joint Interoperability of Tactical Command and Control Systems, TADIL J Interface Management Plan, (reference (l)) identifies the management organization and procedures, the responsibilities, tasks and documentation, and the program milestones/schedule for the TADIL J interface. It further notes the unique support required for the TADIL J test program.

Reference (1) serves as the planning and implementation instrument for TADIL J management.

2004. DEPARTMENT OF THE NAVY

1. Policy. The Secretary of the Navy (SECNAV) fully supports DoD policy regarding interoperability of C³I systems through the developmental and operational efforts of the U.S. Navy and the U.S. Marine Corps.

2. Programs. Interfaces required between Navy and other service systems/equipment are managed by the JTC³A programs outlined above. In amphibious operations, Navy/Marine Corps interoperability is achieved through the continuous cooperation by both services in ensuring that ships supporting the Marine Corps have, or are planned to have, compatible tactical data systems and interconnecting equipment. Current programs include plans to equip flag-configured amphibious ships with TDSs being developed by the Marine Corps. Navy/Marine Corps interoperability is also achieved through the insertion of applicable requirements and standards into joint programs, and subsequent incorporation into Navy and Marine Corps systems.

2005. U.S. MARINE CORPS

1. Policy. The following Marine Corps policy for interoperability is stated in reference (a). Responsibilities within the Marine Corps for carrying out this policy are outlined in chapter 9.

a. Marine Corps TDSs and interconnecting equipment shall be intraoperable and interoperable to the degree required to fulfill DoD guidance and Marine Corps operational requirements. CMC (CC) shall be responsible for establishing intraoperability and interoperability requirements and publishing these requirements in the Technical Interface Concepts. A Marine Corps Interoperability Policy Board (IPB) shall develop recommended interoperability requirements and policy to CMC (CC). CMC (CC) is the configuration manager for reference (b) and establishes guidance for the configuration management of the Marine Corps Technical Interface Concepts, Technical Interface Design Plan, and other Marine Corps interoperability configuration items.

b. TDSs and equipment to be used in the Marine Corps shall undergo appropriate certification testing in accordance with established criteria.

c. Funding to satisfy interoperability requirements shall be the responsibility of each system sponsor. Funding of interoperability requirements that are not directly related to a single system shall be the responsibility of CMC (CC).

d. Configuration control of Marine Corps intraoperability standards shall be exercised by the Commanding General of the Marine Corps Development and Education Command. CMC (CC), through CG MCDEC, is the configuration manager for these configuration items.

e. CG, MCDEC shall also be responsible for Marine Corps participation in the joint and allied interoperability configuration management processes.

f. Marine Corps interoperability standards, as well as those which are jointly approved, will be stated in appropriate requirements documents and TDS and equipment specifications. They shall be incorporated during equipment design. The level of incorporation will be reviewed and reported at each decision milestone in accordance with reference (c). The design of the equipment shall be such that changes to interoperability standards can be accommodated with minimal impact.

g. Whenever possible, the Marine Corps will avoid procuring systems that do not use approved joint or Marine Corps standards. Allied capabilities will be properly and thoroughly considered before any new developments are begun. However, other acquisition considerations will often dictate the procurement of a system that has been developed by another service. In such cases, either the system will be modified to use approved standards or the standards used by the system must receive joint or Marine Corps approval. Marine Corps approval will be predicated upon, but not solely based upon, the establishment of adequate controls to ensure that the impact upon Marine Corps systems, equipment, and interoperability is considered during the configuration management of the standard. The use of buffering, translative, or similar devices to accomplish inter- or intraoperability will be minimal.

h. CMC(L) is the configuration manager for fielded software. This point is considered particularly important because of the requirement to integrate hardware, for which CMC(L) is the configuration manager, with software. Additionally, changes to software and hardware configurations are likely to affect the operation of test program standards in automated equipment, another CMC(L) area of responsibility.

i. System sponsors have a life cycle responsibility for the system and its operations, and will participate in configuration management of their systems from the operations perspective; i.e., additional capability required, procedural changes, etc.

2. Programs

a. Tactical Systems Inter/Intraoperability Program. Implementation of Marine Corps intraoperability and joint interoperability requirements and standards is accomplished in the Marine Corps by acquisition coordinating groups for individual TDSs/interconnecting equipment and monitored by TACSIIP. The objective of TACSIIP is to ensure that Marine Corps TDSs are interoperable and intraoperable to the degree required to fulfill DoD guidance

and Marine Corps operational requirements. TACSIIP also provides unified management for Marine Corps participation in joint and allied interoperability programs. The program is managed and sponsored by CMC (CC) and executed by CG, MCDEC. Tasks under TACSIIP include, but are not limited to:

(1) Developing and maintaining a Marine Corps Interoperability Management Plan (IMP).

(2) Developing and maintaining interoperability requirements stated in the Technical Interface Concepts.

(3) Developing and maintaining the Marine Corps Interoperability Data Base (IDB).

(4) Operating the Interoperability Configuration Control Board (ICCB) under the guidelines of reference (a) and the Marine Corps Interoperability Configuration Management Plan.

(5) Providing Marine Corps representation to joint and allied working level interoperability standards configuration management groups.

(6) Providing technical support to Marine Corps representatives of joint and allied interoperability configuration control boards.

(7) Developing and maintaining Marine Corps intraoperability standards to include publication in the Technical Interface Design Plan for Marine Tactical Systems.

(8) Developing, maintaining and implementing certification procedures to ensure compliance with interoperability requirements and standards.

(9) Analyzing interoperability issues resulting from technology and increased levels of Marine Corps automation.

(10) Reviewing individual tactical data system interface documents to ensure Marine Corps and/or joint interoperability standards are specified, achieved, and managed in TDSSs.

(11) In coordination with system Development Project Officers (DPOs) and Deputy Chief of Staff for Installations and Logistics, Director Materiel Division (CMC (LM)), monitoring the configuration control of TDSSs during development and after fielding.

(12) Verifying that joint interoperability considerations are appropriately reflected in developing Marine Corps systems.

b. Joint Interoperability of Tactical Command and Control Systems. The Marine Corps actively participates in the DoD-directed, JTC³A-managed, JINTACCS Program. The objective of the Marine Corps' involvement in the

JINTACCS Program is to ensure that Marine Corps tactical data systems will interface effectively in joint operations with systems of other U.S. services to the degree required by approved joint documentation. Details of that participation are covered in the MCICMP.

c. Marine Corps Integrated Communications Support. MCICS is the Marine Corps tactical communications network, consisting of all personnel, equipment, and data required for communications in the Fleet Marine Force. MCICS is a broad term used to collectively refer to the communications systems that provide the connectivity for Marine Corps units. Chapter 5 of the Marine Corps Command and Control Master Plan (reference (m)), outlines the development of this communications system from the present time to the year 2000, as reflected in current Marine Corps planning.

d. Command and Control Master Plan (C²MP). The C²MP is an information document under the MCICS Program. The purpose of the C²MP is to provide for coordinated management of development, acquisition, and employment of TDSs in the Marine Corps. It describes the evolution of Marine Corps tactical data systems and interconnecting equipment from 1986 to 2000 and provides general policy and guidance for the development, acquisition, and employment of tactical data systems/equipment.

2006. NORTH ATLANTIC TREATY ORGANIZATION

1. Policy. It is NATO policy that automated tactical C³ systems used by NATO forces be interoperable to the extent determined and agreed upon in accordance with the information exchange requirements of cooperating forces.

2. Programs. In pursuing the objective of improved interoperability among member forces, the Military Committee of NATO, in 1978, formed the Allied Tactical Data Systems Interoperability Agency (ATDSIA), responsible for the development of common interface standards (CINS) for NATO tactical data systems. Since 1978, the responsibilities of the Agency have been expanded to include interoperability issues of data systems beyond the tactical level and the Agency's name has been changed to the Allied Data Systems Interoperability Agency (ADSIA). NATO interoperability programs are discussed in the following documents:

a. NATO Interoperability Management Plan (NIMP). The NIMP (reference (n)) outlines the overall NATO approach to the improvement of the interoperability of command and control systems within the NATO Command, Control, and Information System (NCCIS), including systems of the U.S. and other national components, as appropriate. The plan provides the basis for the development of a common reference base for the design of future command, control, and information systems. In essence, the NIMP provides the direction for development of interoperability standards, which in NATO are divided into three areas:

(1) Operational Interoperability Standards that specify military objectives/operational requirements, tactical doctrine/procedures, standard military language, and specific information exchange plans.

(2) Procedural Interoperability Standards that specify procedures related to the forms in which information is transferred, standard reporting language, and operating procedures for NATO data links.

(3) Technical Interoperability Standards that specify functional, electrical, and physical characteristics necessary to allow exchange of information between different equipment systems.

b. NATO Interoperability Planning Document (NIPD). The NIPD (reference (o)) provides information exchange requirements for interfacing operational facilities. It gives guidelines for the identification of problem areas of interoperability that require the development of CINS and specifies the coordinating role of the ADSIA between the different NATO bodies involved. The NIPD translates the policy of the member nations as set forth in the NIMP into a clear description of the methodology for development of the CINS.

c. NATO Common Interface Standards Configuration Management Plan (NCINSCMP). The NCINSCMP, currently being developed, will document the process by which the CINS will be managed and maintained. This will include the procedure for development of changes to the CINS and for recording and reporting these changes.

INTEROPERABILITY MANAGEMENT PLAN

CHAPTER 3

INTEROPERABILITY REQUIREMENTS AND STANDARDS

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INTEROPERABILITY MANAGEMENT PLAN

CHAPTER 3

INTEROPERABILITY REQUIREMENTS AND STANDARDS

3000. PURPOSE. The purpose of this chapter is to present a methodology for determining interoperability requirements and standards from valid operational requirements (paragraph 3001) and to prescribe how interoperability requirements and standards are to be documented (paragraph 3002).

3001. METHODOLOGY FOR DETERMINING INTEROPERABILITY REQUIREMENTS AND STANDARDS

1. General. The problem of ensuring interoperability between forces, units, elements and systems is one of determining which interoperability requirements and standards should be imposed on tactical data systems to ensure effective information exchange. Further, interoperability requirements and standards must be an integral part of the command and control architecture, so it is necessary to model the architecture. The Director, Development Center (D101) is developing a comprehensive description of the USMC C² architecture; one that accepts operational requirements and produces interoperability requirements and standards.

2. The USMC C² Architecture. An architecture is an aggregate or set of elements systematically associated and structured to accomplish a purpose. A command and control architecture, then, is a set of associated command and control elements, called operational facilities. The basic C² architectural entities are illustrated in figure 3-1 and are described below.

a. Operational Facilities. OPFACs are those elements specifically tasked to plan, direct, coordinate and/or control tactical operations. Each includes equipment, communications, facilities, personnel, and procedures that assist the commander in performing essential command and control functions. OPFACs vary widely in size and complexity. Examples of an OPFAC include a fire support coordination center (FSCC), forward observer (FO), and direct air support center (DASC).

b. OPFAC Tasks. OPFAC tasks are those functions performed by an OPFAC that require it to exchange information with other OPFACs. They are extracted from existing documents reflecting approved doctrine, procedures and techniques, and contribute to the overall command and control task. Since OPFAC tasks give rise to information exchange, interoperability standards must be selected or developed to satisfy those tasks. Mission area sponsors have the responsibility to define OPFAC tasks. OPFAC tasks are documented in the USMC TIC.

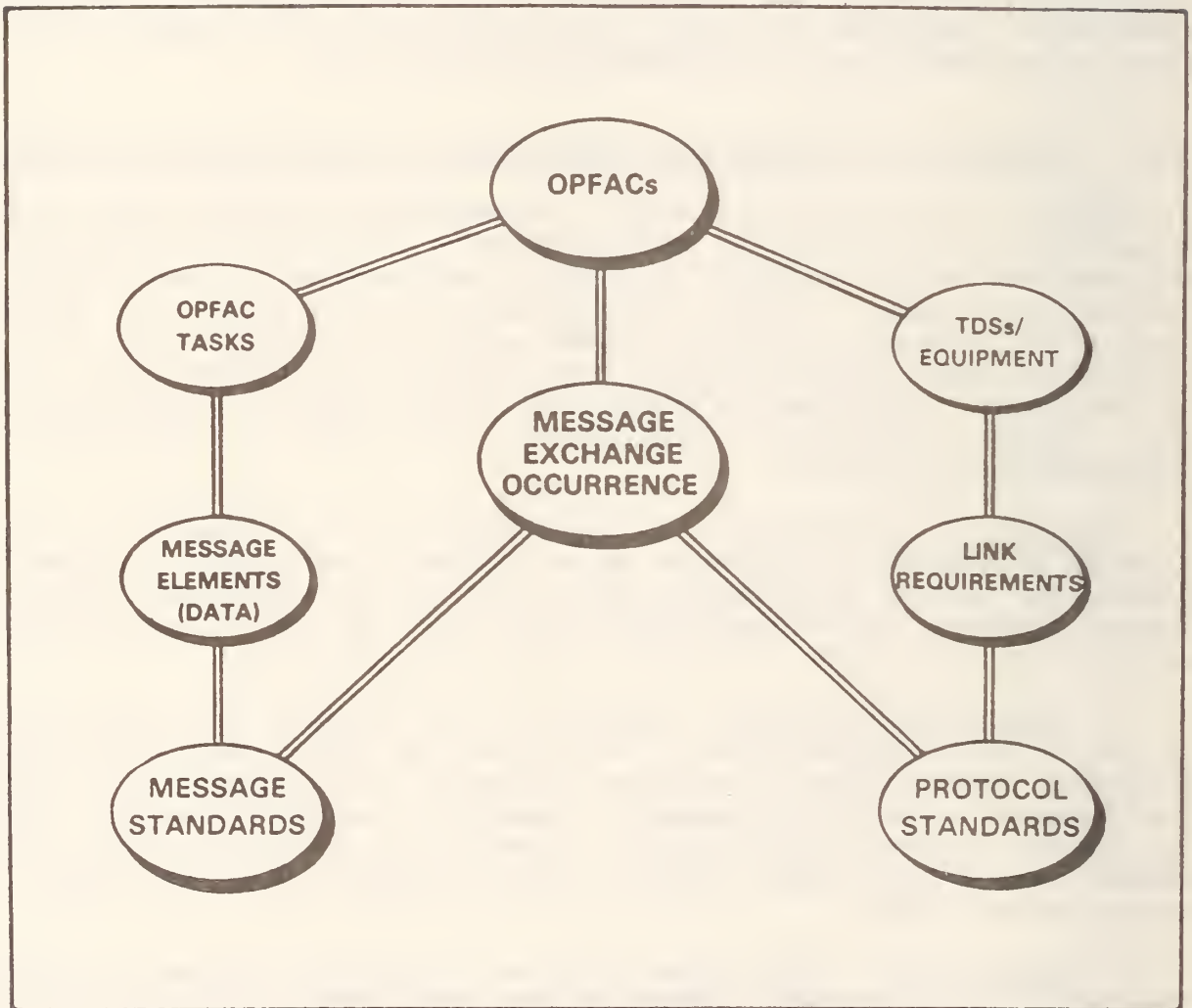


Figure 3-1.--USMC C² Architecture.

c. Message Elements and Message Standards. Message elements are those elements of information used to construct messages. Message elements are typically composed of standard Data Field Identifiers (DFIs), Data Use Identifiers (DUIs) and Data Items (DIs) used to implement information exchange in Marine Corps TDSs. Message elements are collected and formatted into standard messages that satisfy OPFAC tasks and their information requirements. Marine Corps message elements and messages are documented in the TIDP Volumes III and IV, respectively. See paragraph 3002 for joint and other service sources of message elements and messages.

d. TDSs/Equipment and Link Requirements. OPFACs relate one to another as either the source or sink member of a needline. Each needline defines a requirement to establish a communications link to support information flow between those OPFACs. The communications link is established by a string of TDSs and interconnecting equipment, each of which can be characterized by their functions. Communication links are constrained by operational and technical factors. These factors include such things as range and degree of security. The result is a set of link requirements imposed by these constraints. The requirements are ultimately quantified as specifications, which collectively are used to select or develop protocols.

e. Protocol Standards. Protocols are the rules or procedures by which information is transferred through systems, interconnecting equipments and networks. Marine Corps standard protocols are defined in terms of an eight-layered reference model beginning with the transmission media and ending with the user application. This model and protocol standards are documented in the TIDP Volume V. Paragraph 3002 identifies other sources of protocols.

f. Message Exchange Occurrences. The Marine Corps command and control architecture is described fundamentally as the set of OPFACs exchanging information, the links connecting them, and the information exchanged. A message exchange occurrence summarizes this information in a single statement by listing the sending OPFAC (source), the receiving OPFAC (sink), the link between the two, and the message that transports information from one OPFAC to another, as shown in figure 3-2.

3. Determining Interoperability Requirements

a. Stating the Interoperability Requirement. The interoperability requirement for a tactical data system is stated in terms of what OPFACs and OPFAC tasks the TDS will support, the other systems/equipment the TDS must interface with and the level (manual, semiautomated, fully-automated) of each interface, and the general type of information to be exchanged. OPFAC interoperability requirements are stated in a similar manner.

b. OPFAC Task Analysis. Since OPFACs are characterized by their tasks, an examination of the task can establish the information required by other OPFACs potentially involved in an exchange. This defining procedure is normally accomplished through a functional task decomposition as part of mission area analyses. Once decomposed, the task results in a set of

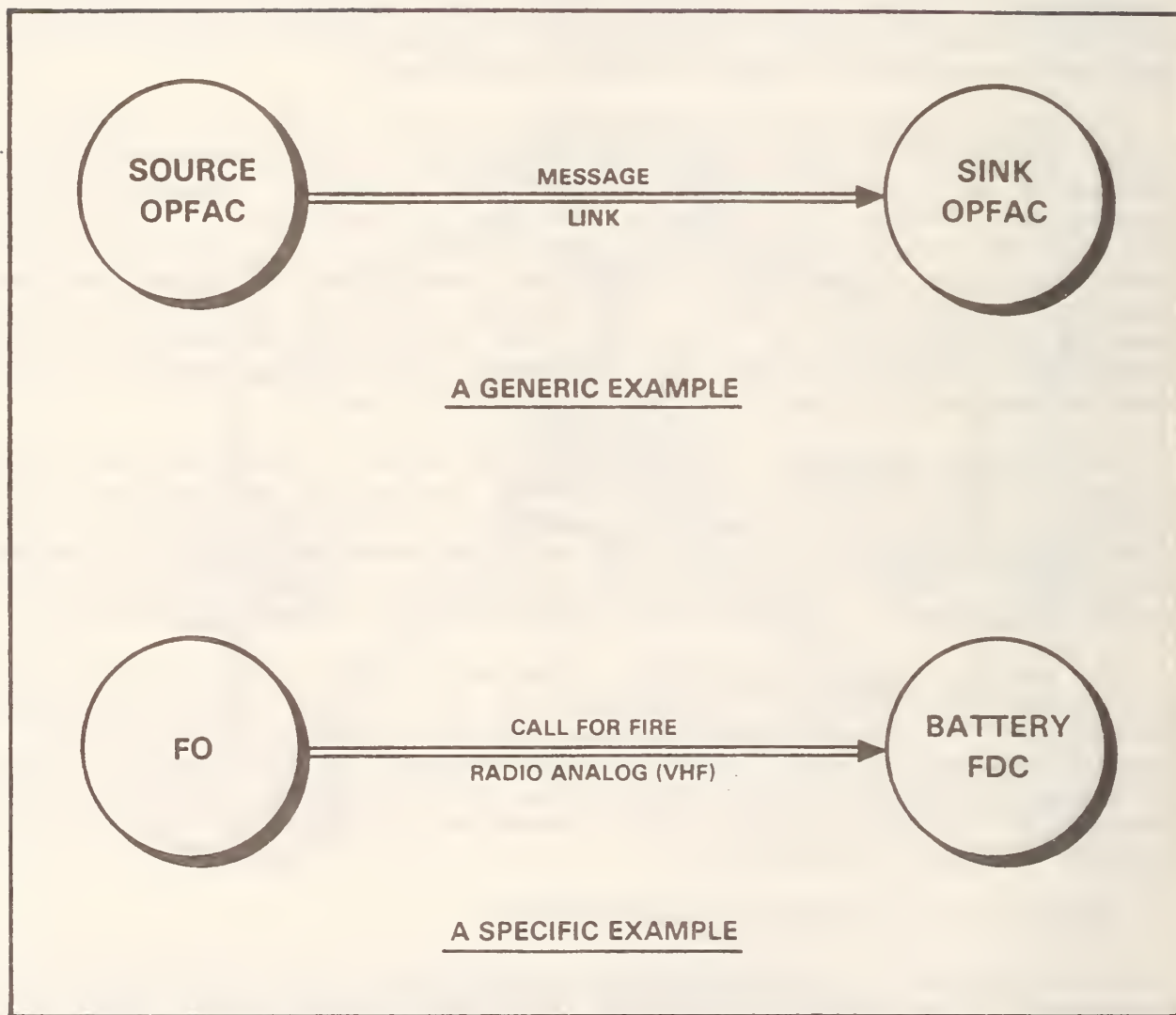


Figure 3-2.--Message Exchange Occurrence.

elemental subtasks whose structure mirrors the structure of the general task. There is an elemental input and output of information associated with each elemental subtask. At these levels, the input or output is referred to as a message element. For example, a call for fire from an FO invokes a set of well-defined procedures that reflect the elemental subtasks performed by the fire direction center (FDC). To process the request, the FDC requires various message elements from the observer, such as target and fuzing data, in order to effectively accomplish its fire support tasks. At least three outputs result from this process, including fire commands to the battery, notification to the FO and updates to the FDC data base. Thus, by tracing the activity in terms of tasks performed, the information required as input and distributed as output can be identified and standardized, and interoperability requirements can be derived.

4. Selecting or Deriving Interoperability Standards

a. Stating Interoperability Standards. Message, data, and protocol standards that satisfy a TDS's interoperability requirements must be selected from approved joint or Marine Corps standards by the system sponsor and specified in TDS specifications. If new standards are required, they will be developed by the system sponsor, assisted by the Development Center. New standards must receive joint or Marine Corps approval prior to a system or equipment production decision.

b. Message and Data Standards. Message exchange occurrences contained in Volume II of the TIDP, plot the general flow of information between OPFACs based on Broad Operational Tasks (BOTs). These diagrams provide (1) the top level flow of services among Marine Corps OPFACs, (2) a basis for defining operational and interoperability requirements in a form useful for development and eventual maintenance, and (3) traceability between interoperability requirements and design at all levels. The TIDP requires that subordinate TDS system-level diagrams (SLDs) be developed by each system sponsor to detail specific messages, message elements, and communications requirements. These SLDs must specify the occurrence and sequence of all OPFAC subtasks, and identify all information requirements, including the required sets of message elements (data elements). Messages to meet these requirements can then be selected from existing, approved messages or developed and proposed as additions to the TIDP in accordance with approved CM procedures.

c. Protocol Standards. Link requirements can be broken down into successive levels of detail through engineering analysis. For example, the requirements must specify radio or wire, analog or digital, frequency range, bandwidth, single channel or spread spectrum, the multiplex scheme, modulation, signal quality, and data rates. From these requirements, the applicable protocols are selected and associated with existing equipment specifications. The TDS and equipment whose specifications match the protocols then can be implemented on the link. If no TDS or equipment set exists, the protocols are adopted as the set of design specifications.

3002. INTEROPERABILITY REQUIREMENTS AND STANDARDS DOCUMENTATION. The documents that support management tasks related to selecting and/or designing interoperability requirements and standards are covered below. They consist of a series of interrelated documents as shown in figure 3-3. The subparagraphs briefly describe each document's intended purpose. In addition to the existing documentation, automated data bases are being developed that will support Marine Corps offices and activities in the continued execution of interoperability management tasks. With the advent and evolution of other automated support systems and data terminals, these data bases may eventually reduce the amount of paper documentation required, thereby increasing efficiency and saving document maintenance costs. These data bases are also described below.

1. Documentation Hierarchy and Interrelationships

a. Interoperability Requirements

(1) USMC Technical Interface Concepts. The TIC documents the Marine Corps interoperability requirements. It describes key Marine Corps, joint and allied interoperability standards documentation and identifies Marine Corps, joint and other service operational facilities. It lists each Marine Corps OPFAC-to-OPFAC interface, indicates the specific tasks and interface levels for each interface and, where applicable, the tactical data systems involved. Finally, the TIC shows all TDS-to-TDS interface requirements. The TIC is the baseline for all other Marine Corps interoperability documentation and actions. The TIC is approved and configuration-managed by CMC (CC); changes are processed in accordance with procedures contained in the MCICMP. Mission area sponsors, defined in MCO P5000.10, participate in the maintenance of the TIC by recommending changes to CMC (CC) in accordance with MCO 3093.1B and the MCICMP.

(2) Required Operational Capabilities. ROCs for individual Marine Corps tactical data systems and interconnecting equipment are the responsibility of the CG, MCDEC, in accordance with MCO 3900.4C, Marine Corps Program Initiation and Operational Requirements Documents (reference (p)), and will reflect the appropriate interoperability requirements of the TIC. Those Marine Corps and joint/allied requirements will be detailed in sections 3 and 5 of each ROC. If the employment of the TDS or equipment being acquired requires modification of the requirements of the TIC, the sponsor will recommend appropriate changes to the TIC as outlined by MCO 3093.1B concurrent with the staffing of the requirements document. The TIC change must be approved prior to ROC approval. Once approved and promulgated, the ROC becomes the baseline for all subsequent system documentation. ROCs are formatted and processed in accordance with MCO 3900.4C. Other service ROCs and Joint Service Operational Requirements (JSOR) are also reviewed by CMC (CC) and appropriate mission area sponsors. Required TIC changes resulting from the reviews will be proposed by the sponsor and/or CMC (CC).

INTEROPERABILITY MANAGEMENT PLAN

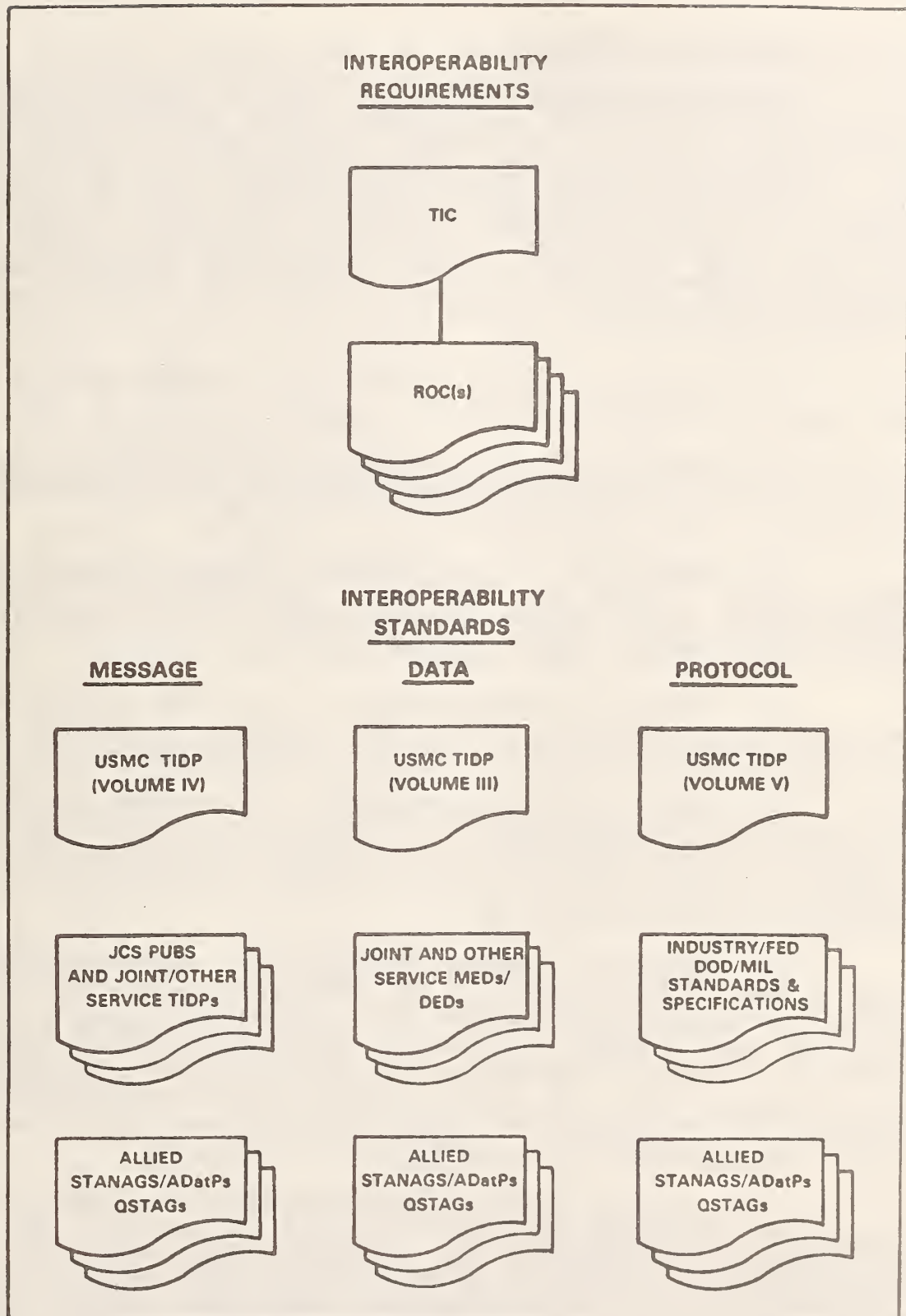


Figure 3-3.--Interoperability Documentation Structure.

b. Interoperability Standards

(1) Technical Interface Design Plan. The TIDP expands the level of detail contained in the TIC and defines Marine Corps interoperability requirements more precisely. It provides baseline design criteria for the various interfaces of Marine Corps TDSs and equipment and is a standard, subject to configuration management. The TIDP is compatible with joint standards to the extent practicable. The TIDP is based upon interoperability requirements of the U.S. Marine Corps TIC and is updated, as required, to support full implementation of the TIC. CG, MCDEC is responsible for the development and configuration control of the TIDP. The composition of the TIDP is as follows:

(a) Volume I - General. This volume introduces the total plan and provides a user's guide to show how the subsequent volumes are used.

(b) Volume II - Multiple Agency Message Exchange Sequences. This volume consists of message exchange occurrences for all operations that have an impact on Marine command and control activities.

(c) Volume III - Data Element Standard (Message Element Dictionary (MED)). Volume III complements other volumes of the TIDP by providing message element (data field identifiers, data use identifiers and data items) standards that support the messages and protocols.

(d) Volume IV - Message Standard. This volume contains approved Marine Corps message standards. It includes information on message purpose, structure, data content and format, as well as acknowledgement instructions.

(e) Volume V - Protocol Standard. This volume describes the Marine Corps protocol standard that Marine tactical data systems must satisfy in order to exchange information via each type of digital data link. Requirements are presented in terms of layered protocols that must be implemented by each Marine Corps TDS.

(f) Volume VI - System Implementation. This volume provides synopses of each interface description for TDSs and associated data switches, terminals and communications centers by outlining the system's approved message and data element and protocol specifications that have been implemented or approved for implementation in an engineering development model (EDM) or production model. The approved specifications are developed from the Marine Corps TIDP (Volumes III, IV, and V) and/or approved joint standards or deviations from standards that have temporary waivers.

(2) Other Service Interoperability Standards. Because of Marine Corps equipment procurement and system acquisition circumstances, some Marine Corps interoperability standards are already provided via other (lead) services. Examples include the Army Tactical Data Link-1 (ATDL-1) standards (used on Tactical Air Operations Central (TAOC)-HAWK interface) and the Battery Computer System (BCS) message standards. The selection (use or

nonuse) of these standards must be determined by the sponsor early and included in the acquisition plan. If other service standards are selected as Marine Corps standards, provisions must be made for Marine Corps participation in the configuration management of those standards. If the new system must interface with other Marine Corps systems, message conversion protocols may be required, along with implementing software procurement or development. If the other service standards are not selected, provisions must be made to develop or procure new message handling software or to transport existing software to the newly acquired system. CG, MCDEC is responsible for operational and technical participation and management at the working level; CMC (CC) is responsible for participation at the planning, programming, budgeting, and policy levels. Specific participation responsibilities and procedures are contained in Appendix Q to the MCICMP.

(3) Joint/Allied Standards. The Marine Corps participates in the development and configuration management of joint and allied interoperability standards as described in reference (j) and the MCICMP. Primary documents include JCS Publication 10, Tactical Command, Control, and Communication System Standards (reference (q)), JCS Publication 12, Joint Interface Operational Procedures (JIOP) (reference (r)) and JCS Publication 25, U.S. Message Text Formatting Program (reference (s)); the Interface Design Handbook (IDH) (reference (t)), JINTACCS Technical Interface Design Plan-Final Edition (TIDP-FE) (reference (u)), JTIDS Technical Interface Design Plan-Test Edition (TIDP-TE) (reference (v)), NATO STANAGs and related Allied Tactical Publications.

(4) Federal Standards. Various federal standards have evolved as a result of the Federal Government Telecommunications Standards Program. These standards are developed in cooperation with industry and normally adopt or incorporate standards promulgated by the American National Standards Institute (ANSI) and the Electronics Industry Association (EIA). When completed, they become Federal Information Processing Standards (FIPS) and are published by the National Bureau of Standards. While the Marine Corps may adapt these standards, there is no active USMC involvement in either their development or configuration control. The two standards below are of special interest.

(a) FED-STD-1003A. Synchronous Bit-Oriented Data Link Control Procedures (Advanced Data Communication Control Procedures) are the basis for the protocols specified for the Unit Level Message Switch (ULMS) and the Digital Communication Terminal (DCT).

(b) FED-STD-1037. A glossary of telecommunications terms; its use in the development of specifications for systems requiring telecommunication functions is mandatory.

(5) DoD/Military Standards. Numerous DoD/Military standards are available for tailoring and use, as deemed desirable by program sponsors and PDAs, in specifying technical requirements for tactical systems. The MIL-STD-188 series, however, has been designated by DoD as mandatory for implementation on appropriate tactical communications systems. The Marine

Corps participates in various working groups involved in the development and modification of these standards. Deputy Chief of Staff for Installations and Logistics, Director Materiel Division (CMC (LMA-1)) is the focal point within the Marine Corps for identification and distribution of tactical communications system technical standards affecting Marine Corps TDS/equipment under the Defense Standards and Specifications Program. Proposed changes may be submitted via Standardization Document Improvement Proposal (DD Form 1426) at any time. DoD/Military standards include:

(a) MIL-STD-188-100 (Series). Common Long Haul and Tactical Communications System Technical Standards.

(b) MIL-STD-188-200 (Series). Military Communications System Tactical Standards, including 188-203-1 (TADIL A), 188-203-2 (TADIL B), 188-203-3 (TADIL C) and 188-203-4 (TADIL J) equipment interfaces.

(c) MIL-STD-188-300 (Series). Long Haul Standards.

(d) MIL-STD-490A. Specification Practices.

(e) MIL-STD-1397A. Input/Output Interfaces, Standard Digital Data, Navy Systems.

(f) MIL-STD-1553A. Aircraft Internal Time Division Command/Response Multiplex Data Bus.

(6) Joint Equipment (JTC³A/TRI-TAC) Specifications. There are numerous JTC³A/TRI-TAC performance and product specifications for jointly developed communications equipment and supporting COMSEC. Many of these items are standard Marine Corps equipment. Selection of these interoperability specifications is appropriate whenever new Marine Corps TDSs or other communications equipment must physically interface with existing or planned TRI-TAC equipment.

(7) Marine Corps Equipment Standards. Standards for interfacing to Marine Corps-unique communications equipment would be in the form of existing product specifications in either MIL-STD-490A or commercial format. The Development Project Officer (DPO) is responsible for identifying, specifying, and providing these standards to the PDA and system or equipment developer.

c. Interoperability Automated Data Bases. The following data bases are under development by MCDEC under the TACSIIP program.

(1) Interoperability Standards Data Base (ISDB). The ISDB is designed to contain Marine Corps standards for message and data requirements. The data base system is planned to be an adjunct of the JTC³-CDBS, which will store joint message and data standards. User terminals will be located at key Marine Corps organizations and staff locations. The ISDB currently includes design and data for the messages and data standards of the TIDP. CG, MCDEC (D101) is responsible for ISDB development, implementation, and support.

(2) Interoperability Data Base (IDB). The IDB will extend the ISDB to provide views of the C² architecture, including OPFACs, their tasks and equipment; message element and message standards; and equipment specifications and protocol standards. It is intended to support the total interoperability management process. CG, MCDEC (D101) is responsible for IDB development, implementation, and support.

2. Procedures for Identification of System Interoperability Requirements, Standards, and Specifications

a. Development of ROC(s). The DPO is responsible for developing the ROC. The key to identifying interoperability requirements is to first identify the OPFACs where the new system/equipment will be employed and the OPFAC tasks it will support. The following ROC paragraphs are critical to the complete and accurate identification of interoperability requirements.

(1) Paragraph 2, Threat and/or Operational Deficiency

(a) Counter a New Threat. If the equipment is to counter a new threat, the nature of the threat will normally determine the affected (or target) friendly organization, OPFAC, or equipment. The functional capability of the new item or its operational concept may also dictate where the system or equipment should be employed.

(b) Correct an Operational Deficiency. If the new item is to correct an operational deficiency by replacing an existing item or equipment, then the operational and organizational concept of the replaced item may be appropriate to use to identify interface requirements.

(2) Paragraph 3, Operational and Organizational Concepts. This paragraph must address the mission requirements and answer questions of where, how, under what environmental conditions, and by which organization (including OPFAC) the new item will be used. Given this information, the DPO will then review the TIC to determine all Marine Corps and joint/allied interoperability requirements. The DPO will coordinate this section of the ROC with CG, MCDEC (D101) to ensure that all appropriate interoperability requirements of the TIC are identified. If no TIDP standards exist for these requirements, CG, MCDEC (D101) may be requested to assist the sponsor in researching, analyzing, and developing the standards for ICCB review and CG, MCDEC approval. If the process of developing the requirements document indicates a needed change to the TIC, the sponsor will submit proposed changes to CG, MCDEC (D101) for consideration in accordance with the MCICMP.

(3) Paragraph 5, Inter/Intraoperability and Standardization Requirements. The DPO will review the current version of the C²MP to ensure that other planned systems and equipments in the same OPFAC, echelon, or functional area are reviewed for potential interface requirements. Other service, joint, and allied systems will likewise be reviewed for potential requirements. Once

determined, all interoperability requirements will be included in this paragraph to later be addressed in the system or equipment functional (Type A) specification. Specific or projected joint/allied interoperability requirements, including standards, will be identified in accordance with reference (h); otherwise a statement that there are no known existing, planned, or potential joint or combined interfaces will be made.

(4) Paragraph 6, Related Efforts. The DPO will ensure that this paragraph includes all other Marine Corps, other service, joint, or allied systems/equipments under development or planned for development, that have real or potential interface requirements with the item referred to in the ROC.

b. TIC and TIDP Updates. Once a tactical data system-related ROC is proposed to CMC (RD), the sponsor will concurrently take action to update the appropriate parts of the TIC (and TIDP, if appropriate) by preparing and submitting Interoperability Change Proposals (ICPs) to CG, MCDEC (D101) in accord with the MCICMP. The ICCB will forward proposed changes to the TIC, with recommendations, to CMC (CCA) for Interoperability Policy Board (IPB) action and CMC (CC) approval. Proposed changes to the TIDP will be reviewed by the ICCB and approved by CG, MCDEC, as appropriate.

INTEROPERABILITY MANAGEMENT PLAN

CHAPTER 4

INTEROPERABILITY IMPLEMENTATION AND VERIFICATION

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INTEROPERABILITY MANAGEMENT PLAN

CHAPTER 4

INTEROPERABILITY IMPLEMENTATION AND VERIFICATION

4000. GENERAL. This chapter describes procedures for implementation of the requirements and standards discussed in chapter 3 and verification of those standards via contractual and review procedures. For the purposes of this plan, implementation refers to those procedures used to ensure that Marine Corps interoperability requirements and standards are designed into the systems and equipment being built. Verification confirms that requirements and standards were implemented.

4001. IMPLEMENTATION OF STANDARDS AND SPECIFICATIONS

1. The Implementation Flow. The process of implementation begins when interoperability requirements are identified in requirements documents. Interoperability standards are selected that fulfill these requirements and are translated through a series of ever expanding and increasingly detailed TDS and interconnecting equipment specifications. This process is shown pictorially in figure 4-1. Procedures supporting these implementation steps are discussed below.

2. Procedures. Interoperability standards for new TDSs and equipment are implemented as an integral part of the system acquisition process. This chapter describes implementation for a typical system/equipment acquisition; specific programs may differ in scope and detail, depending on the acquisition strategy selected. The adequacy of implementation from the viewpoint of interoperability is evaluated at Marine Corps Program Decision Meeting (MCPDM) or In-Progress Review (IPR) Committee milestones as discussed in paragraph 4003. Requests for waiver of the published interoperability standards, or interoperability change proposals to modify the published standards, are evaluated through a formal configuration management process covered in MCO 3093.1B and the MCICMP. Requests for deviations and waivers from equipment specifications are covered in MCO 4130.5, Marine Corps Configuration Control Procedures (reference (w)). The implementation process, from approval of the ROC to contract award, is summarized in figure 4-2. The process of implementation, beyond contract award and through approval of the allocated baseline (in full scale development) and/or product baseline (in production) is schematically shown in figure 4-3.

3. Acquisition Documentation and Baselines

a. Acquisition Plan (AP). In accordance with MCO P5000.10__, the system/equipment acquisition program sponsor is responsible for development and maintenance of the AP. The sponsor will ensure that system interoperability requirements receive appropriate attention for management visibility and review at each MCPDM/IPR milestone. The following subjects will, as a minimum, be included in the listed AP sections:

INTEROPERABILITY MANAGEMENT PLAN

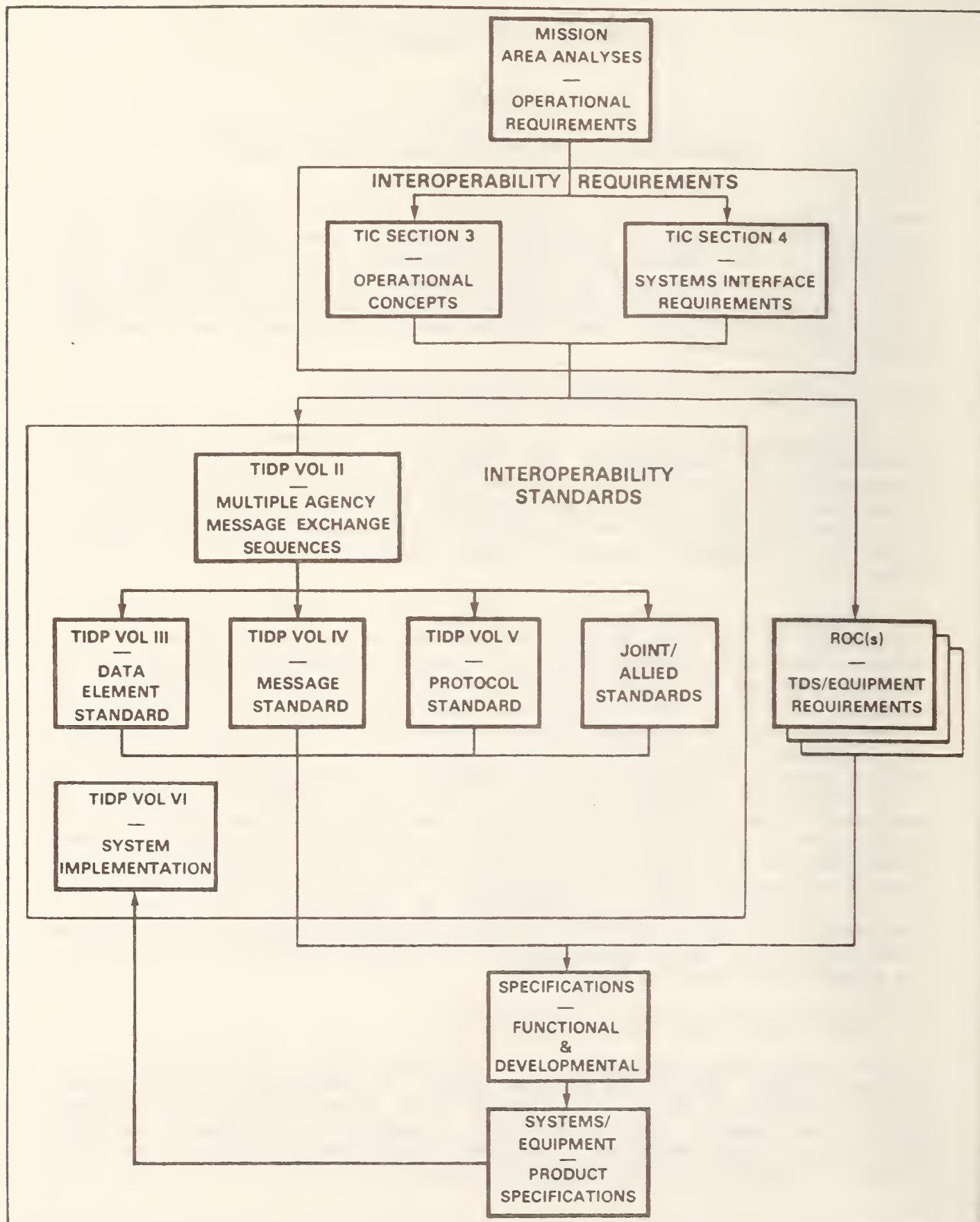


Figure 4-1.--Interoperability Requirements Implementation.

INTEROPERABILITY MANAGEMENT PLAN

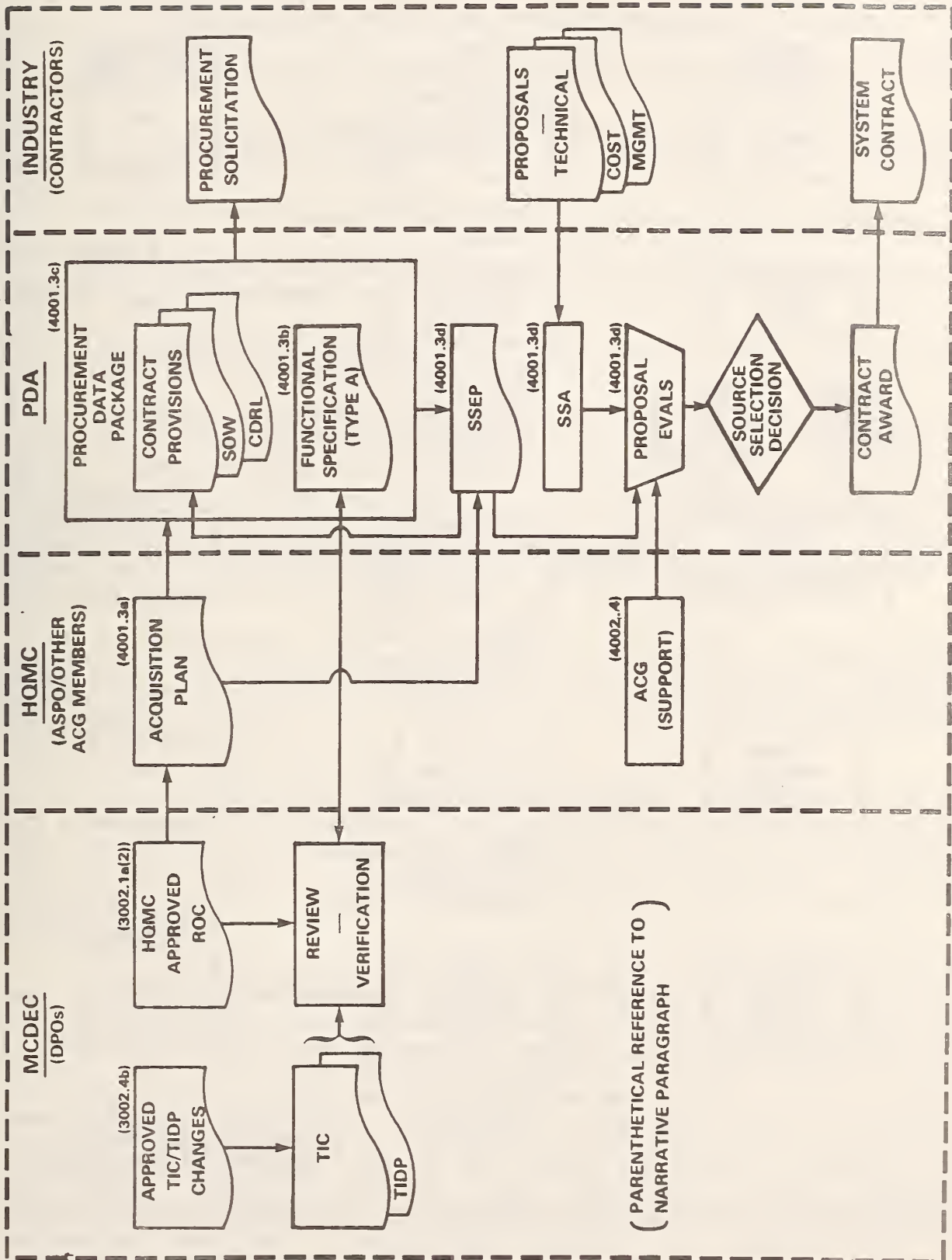


Figure 4-2.—Interoperability Standards Implementation (Approved ROC To Contract Award).

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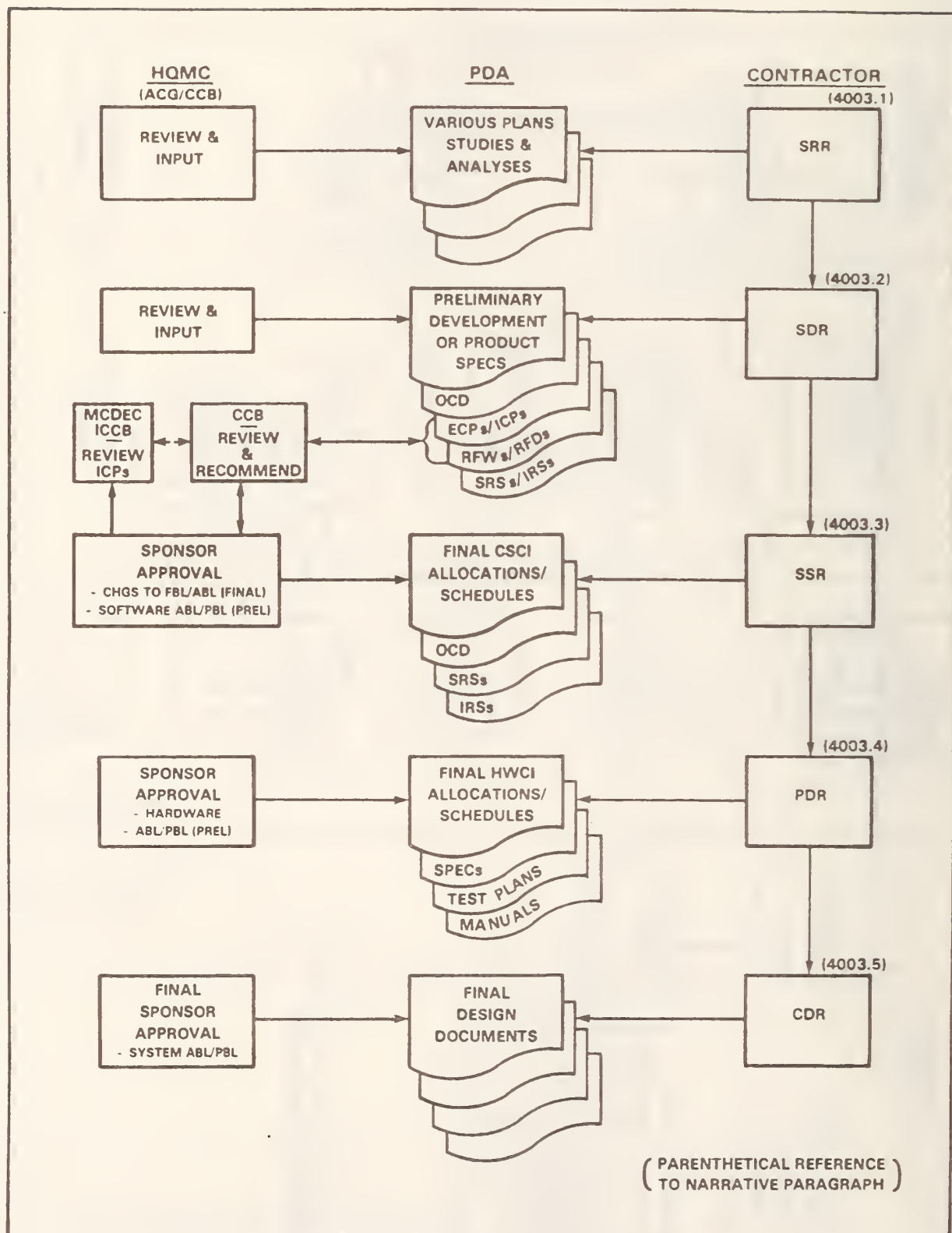


Figure 4-3.—Interoperability Standards Implementation (To ABL/PBL Approval).

- (1) Program/System Description (mission interface requirements).
- (2) Program Risk (technical or schedule risk related to specific interfaces).
- (3) Integrated Logistics Support (ILS) Planning Concept (configuration management aspects).
- (4) Test and Evaluation Approach (standards verification aspects).
- (5) Government-Furnished Information (GFI) Requirements (provision of interoperability standards).
- (6) Acquisition Objectives/Milestones (interoperability test schedules; joint interface testing, if any).

b. Functional Specification. The designated PDA for the system/equipment requirement will ensure, with DPO and CG, MCDEC (D101) support as required, that all interoperability requirements specified in paragraphs 3 and 5 of the ROC are expanded in section 3.c and 3.1.7 (or by separate appendix) of the Type A specification, to include specification of all pertinent interoperability standards, whether Marine Corps, joint and/or allied in origin. Interoperability issues or problems raised in this timeframe will be addressed to the Acquisition Program Sponsor (APS) and CMC (CC) for resolution.

(1) Methodology for Functionally Specifying Interoperability Requirements. The Acquisition Sponsor Project Officer (ASPO) and system DPO, assisted by CG, MCDEC (D101), will ensure that the PDA-developed functional specification includes, as a minimum, the appropriate interoperability requirements discussed below.

(a) Paragraph 2 - Applicable Documents. The DPO will ensure that all appropriate message, data and protocol standards, including the USMC TIDP, joint TIDPs and MEDs/DEDS, JCS publications, Quadrapartite Standardization Agreements (QSTAGs), NATO STANAGs, Allied Data Publications, and other TRI-TAC/Marine Corps equipment specifications are fully identified for reference purposes.

(b) Paragraph 3.c - Interface Definition. MIL-STD-490A and Data Item Description DI-CMAN-80008 requires that this paragraph define the principle interfaces between this system and other systems with which it must be compatible. Where the two systems interface at different OPFACs and echelons, these interfaces may require different messages and circuits to perform the necessary OPFAC tasks. The DPO/PDA must precisely define each of these interface requirements. Likewise, if different operational modes of employment require different interfaces, this section must specify the differences for each mode. The DPO will review the C²MP to ensure that the system being specified will fit into the existing and/or projected communications architecture. If the system does not fit the communications architecture described in the C²MP, the DPO will identify the new requirements to the CG, MCDEC (D101).

(c) Paragraphs 3.1.1 through 3.1.5 - System Missions, Modes, and Functions. The DPO/PDA will ensure that these paragraphs expand the operational and organizational concepts contained in paragraph 3 of the ROC. The system (or equipment) and its functions will be described in terms of its relationship to other systems/equipment in paragraph 3.1.5. The anticipated deployment or use of the system for each mission will be described both organizationally and geographically, to include the specific OPFACs, echelons, and elements that will use the system. Key performance factors that affect the system's operational or organizational employment will also be described.

(d) Paragraph 3.1.6 - Functional and Performance Requirements. Selected subparagraphs of this section may have interoperability impacts. For example, data transmission and throughput characteristics must be compatible with interfaced communications equipment characteristics. Likewise, power requirements should address all potential operating environments; e.g., garrison, tactical, and shipboard. The DPO will verify that the performance characteristics specified are compatible with interfaced equipment and support the operational environment.

(e) Paragraph 3.1.7 - Interface Requirements. All system interface requirements will be specified in detail or reference other separate detailed standards and specifications. All external and internal interfaces are quantitatively defined, including hardware-to-hardware, hardware-to-software, and software-to-software interfaces.

(f) Paragraph 3.2.1 - Physical Requirements. Specified physical requirements must be compatible with interfaced equipment including communications and COMSEC equipment. The DPO is responsible to verify the compatibility of the specified system/equipment with all other interfaced equipment.

(g) Paragraph 3.5.4 - Personnel. If the interoperability aspects of the system will require additional personnel or new skills, they will be quantitatively and qualitatively described in this paragraph. The DPO will coordinate these requirements with the Manpower Point of Contact (MPOC) of the ACG.

(h) Paragraph 3.5.5 - Training. This paragraph will describe government and contractor responsibilities for training requirements generated as a result of the interoperability features of the system such as message preparation and transmission, and physical interface connections. Training requirements must be carefully detailed, to ensure that pre-test training requirements are fully satisfied prior to system testing. The DPO will coordinate these requirements with the Training Point of Contact (TPOC) of the ACG.

(i) Section 4 - Qualification Requirements. The system test philosophy and all planned developmental tests, operational tests, and interoperability tests will be summarized in paragraph 4.1.1. Test responsibilities will be detailed in paragraph 4.1.3 and include contractor, MCDEC, Marine Corps

Tactical Systems Support Activity (MCTSSA), Marine Corps Operational Test and Evaluation Activity (MCOTEA), Fleet Marine Force (FMF), and JTC³A responsibilities, as required. Coordination of these test requirements with these organizations is the responsibility of the DPO.

(2) Functional Baseline (FBL). Once the Type A specification is approved by the Marine Corps, it becomes the Functional Configuration Identification (FCI) representing the FBL and is brought under configuration management in accordance with DoDD 5010.19, Configuration Management (reference (x)) and MCO 4130.4, Marine Corps Configuration Identification Procedures for Marine Corps Configuration Items (CIs) (reference (y)) (normally at Milestone I). From this point on, the FBL and FCI are under configuration control procedures as specified in MCO 4130.5. The Acquisition Project Officer (APO) will convene a configuration control board (CCB), consisting of himself as chairman, the ASPO and DPO (or their designated representatives), and will prepare a government system configuration management plan for incorporation into the procurement package.

c. Procurement Data Packages. The PDA, although responsible for the preparation of the system/equipment procurement data package, relies heavily on other ACG members, particularly the ASPO, DPO, and APO for guidance, input, and review. A typical system procurement data package includes a set of contract provisions, statement of work, contract data requirements list (CDRL-DD Form 1423) and a system/segment (functional) specification.

(1) Contract Provisions. The specific set of contract provisions is normally determined by the PDA or CMC(L) contracting office, based upon the approved acquisition strategy portions of the AP and other Federal/Defense Acquisition Regulations (FAR/DAR Supplements). The significant Marine Corps inputs relate the content and structure of prospective contractor proposals and in the proposal evaluation criteria. Interoperability requirement considerations may be highlighted and emphasized in both these areas.

(2) Statements of Work. SOW paragraphs should describe appropriate contractor work efforts related to the application of message, data, and protocol standards to system/equipment design, development, integration, testing, and production. These work efforts should include provisions for potential contractor participation on Interface Control Working Groups organized in accordance with MIL-STD-483A, and/or Interoperability Technical Review Groups organized in accordance with the MCICMP, as appropriate. Likewise, procedures for contractor preparation and organization or system reviews and audits (in accordance with MIL-STD-1521B) and submission of Engineering Change Proposal (ECPs) and ICPs should also be covered.

(3) Contract Data Requirements List. The CDRL lists all data inputs required of the contractor during the period of performance. Appropriate military standards, specifications, and data item descriptions (DIDs) are referenced that define and prescribe the contents and format of each data item.

Interoperability-related data items include Contractor Configuration Management Plans and Interface Control Drawings (MIL-STD-483A), Engineering Change Proposals (MIL-STD-480A & 481), Software Configuration Management Plans, Interface Requirements Specifications and Interface Design Documents (DOD-STD-2167) and ICPs (MCICMP, other service configuration management plans, JTC³A Circular 9000, and appropriate allied working group CM directives). Sponsors will ensure that standard DIDs are referenced for each of the various ICPs that contractors may be required to submit. The APO will ensure that the appropriate interoperability data requirements are included in each system/equipment procurement data package.

d. Technical Proposal Evaluations. For all TDS/equipment procurements, the ACG will participate in the development of the source selection evaluation plan (SSEP) for source selection authority (SSA) approval and subsequently participate in technical proposal and/or cost proposal evaluation boards/panels. The ACG will ensure that contractor-proposed plans for interoperability requirements and standards implementation, testing, verification, and configuration management are carefully evaluated. The ACG will also ensure that costs and risks associated with the development, test, and verification of system/equipment interfaces are realistic. Contractor proposals for risk reduction and risk management procedures in these areas will receive appropriate consideration.

e. Development Specifications. The designated PDA is responsible for ensuring that appropriate system/equipment "design-to" development specifications (Type B) are developed in accordance with MIL-STD-490A. These may be either Government or contractor-developed. This effort will be reviewed by the DPO. These specifications will expand on the functional requirements of the system (Type A) specification and specify in detail, or by reference, the individual message, data, protocol, and equipment standards or specifications.

(1) Methodology for Specifying Interoperability Requirements in Development Specifications. The system DPO, assisted by CG, MCDEC (Code D101), will ensure that the system/equipment development specifications fully address all interoperability requirements and specify in detail approved Marine Corps, joint or allied message, data, protocol, and equipment standards, as required. Development specifications will be in either the form of MIL-STD-490A Type B specifications for Hardware Configuration Items (HWCI) or DoD-STD-2167 software requirements specifications (SRSs) and accompanying interface requirements specifications (IRSSs). There may be a number of Type B1, Prime Item Development Specifications for individual subsystems or prime items of equipment, depending on the complexity of the item (TDS versus communications equipment) and the breakout or decomposition of the design. Likewise, the software design for a system may result in many computer software configuration items (CSCIs), each of which require an SRS and IRS. Thus, the first task is to identify early in the development, the contractor-proposed design structure and resulting hardware and software specification trees. Government approval of these development specifications normally occurs at or after the Preliminary Design Review (PDR) (for HWCI) and the Software Specification Review (SSR) (for CSCI). These design reviews are discussed in paragraph 4003.

(2) Allocated Baseline (ABL). When approved, these development specifications become the Allocated Configuration Identification (ACI) representing the ABL and are brought under configuration control procedures as specified in MCO 4130.5. The system/equipment CCB, described in 4001.3b(2) above, exercises configuration control over the ABL in accordance with MCO 4130.5 and the system/equipment configuration management plan. See chapter 7 for additional discussion of CM activities and procedures.

4002. INTEROPERABILITY VERIFICATION PROCESS. The verification process is a series of steps ensuring that all interoperability requirements have been met and assuring that the interfaces will work, and information exchange will occur, as specified. The process begins with the initial verification by the TACSIIP and System DPOs that the ROC has addressed interoperability requirements contained in the TIC and continues through the system/equipment development and acquisition phases. The Mission Area Sponsor is responsible for ensuring that the planned use of a TDS or communication system, as expressed in a ROC, is in accordance with present doctrine or represents a valid requirement to modify doctrine. The system DPO verifies that protocols, message formats and data elements contained in system/equipment specifications are either in accordance with the standards contained in the TIDP or that ICPs are prepared to add or modify standards, as appropriate. This process and its component steps are shown in figure 4-4. Verification responsibilities are described below and in section 3 of table 9-1.

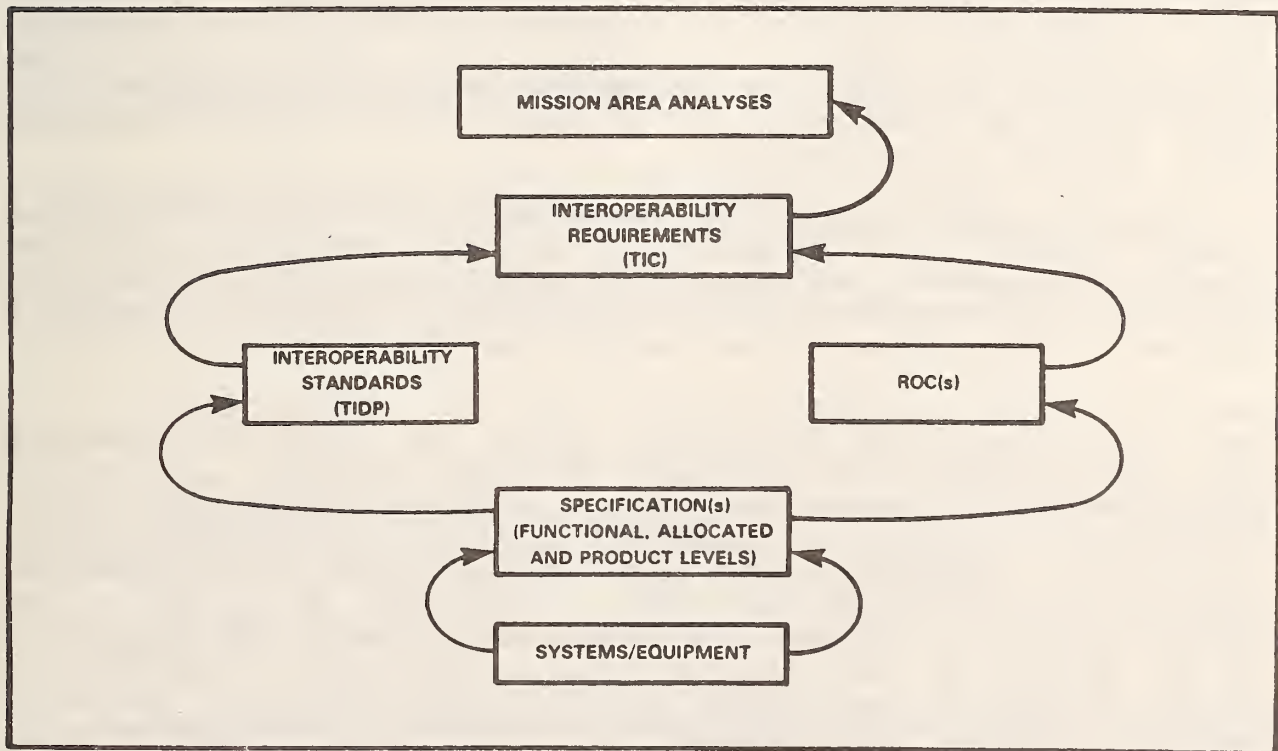


Figure 4-4.--Interoperability Verification Process.

1. TIC Verification. TIC verification will be the first accomplished. Interoperability requirements must stem directly from operational requirements. CMC (CC), is responsible for having the interoperability requirements specified in the TIC validated by the appropriate mission area (MA) sponsor. For those requirements not covered in doctrinal publications, CG, MCDEC (D101) will request and organize functional area working groups to solicit FMF inputs and make final recommendations to MA sponsors. The ICCB will review these results and make final recommendations for adoption and inclusion in the Marine Corps TIC and TIDP to CG, MCDEC (D06).

2. Standards Verification. The second step in the verification process involves confirming that existing Marine Corps message, data, and protocol standards satisfy the requirements of the verified TIC. Those requirements that have no related standards will be analyzed and new or modified standards created by the sponsor, assisted by CG, MCDEC (D101).

3. ROC Verification. Once the above steps are accomplished, individual TDS/equipment ROCs will be verified against the TIC on an individual basis as they proceed from draft to proposed to approved form in accordance with MCO 3093.1B and MCO 3900.4C. System/equipment DPOs will review each ROC annually, as required by MCO 3900.4C, and ensure that the ROC still conforms to the requirements of the TIC.

4. Specification Verification. As specifications are developed for each Marine Corps tactical data system/equipment, system DPOs will review and verify that all interoperability requirements and applicable standards are specified, either directly or by reference. As the design and development effort evolves from the functional level to the product level, DPOs will ensure that interoperability requirements are appropriately detailed and traceable. This process occurs as an adjunct to ACG participation in technical reviews and audits, discussed in paragraph 4003.

5. Systems/Equipment Verification. Verification that the TDS/equipment actually conforms to the interoperability form, fit, and function specifications is accomplished by developmental and operational testing, and functional configuration audits/physical configuration audits (FCAs/PCAs). Testing is discussed in chapter 5; audits are covered in chapter 6.

4003. IMPLEMENTATION AND VERIFICATION REVIEWS AND AUDITS. MIL-STD-1521B prescribes requirements for the conduct of technical reviews and audits of developing systems, equipment, and computer software within DoD. MCO 4130.7, Marine Corps Configuration Technical Reviews and Configuration Audits (reference (2)), establishes Marine Corps responsibilities for the conduct and completion of these reviews and audits. Each member of the ACG will be familiar with these requirements. A key decision, in the process of developing the AP, concerns the cost effective tailoring and selective application of MIL-STD and MIL-SPEC requirements, prior to their contractual imposition. Appendix J of MIL-STD-1521B addresses considerations for the application of review and audit requirements for DoD acquisition programs. Obviously, complex

TDSs will require more extensive Government reviews; less complex equipment would normally require fewer reviews. The acquisition program sponsor will determine which review/audit requirements will be imposed for each acquisition program. Procurement Data Packages will be reviewed by the ACG to ensure that these AP requirements are contractually implemented by the PDA. The following paragraphs discuss those reviews and audits that are pertinent to interoperability implementation and verification and assign additional responsibilities (beyond those in MCO 4130.7) for selected actions and procedures. Figure 4-5 reflects the sequencing of these reviews during full scale development; the same review sequence may be followed during the production and deployment phase. If interoperability requirements or standards were waived by CMC (CC) during development, they will be implemented in production and subjected to the reviews and audits specified in the production contract. Thus production reviews and audits are also critical to successful interoperability achievement. Appendix C contains a series of checklists for use at each of the reviews and audits discussed below.

1. System Requirements Review (SRR). SRRs are normally conducted early after full-scale engineering or production contract award. The purpose of the SRR is to review the contractor's system engineering management effectiveness and output in terms of responsiveness to the SOW and system/equipment requirements. The review items of interoperability interest are listed below; each ACG member will review the contractor's approach to achieving the interoperability requirements from their own perspective. The DPO will ensure the contractor understands each interface requirement and the overall operational and organizational concept.

a. Mission and Requirements Analysis. The contractor should address each system/equipment interface.

b. Functional Flow Analysis. The contractor's analysis should include a functional flow diagram for each system/equipment interface.

c. Preliminary Requirements Allocation. This review should reflect the allocation of interface requirements to specific HWCIs and CSCIs for subsequent Marine Corps tracking and review.

d. Trade Studies. Any Trade Studies addressing interface requirements should be reviewed.

e. Engineering Specialty Discipline Studies. Engineering specialty discipline studies affecting interoperability, such as electromagnetic compatibility and vulnerability studies, should be reviewed.

f. Program Risk Analysis. Risks associated with interface(s) should be minimized.

g. Integrated Test Planning. The contractor should address special test requirements related to joint and Marine Corps interoperability testing and certification.

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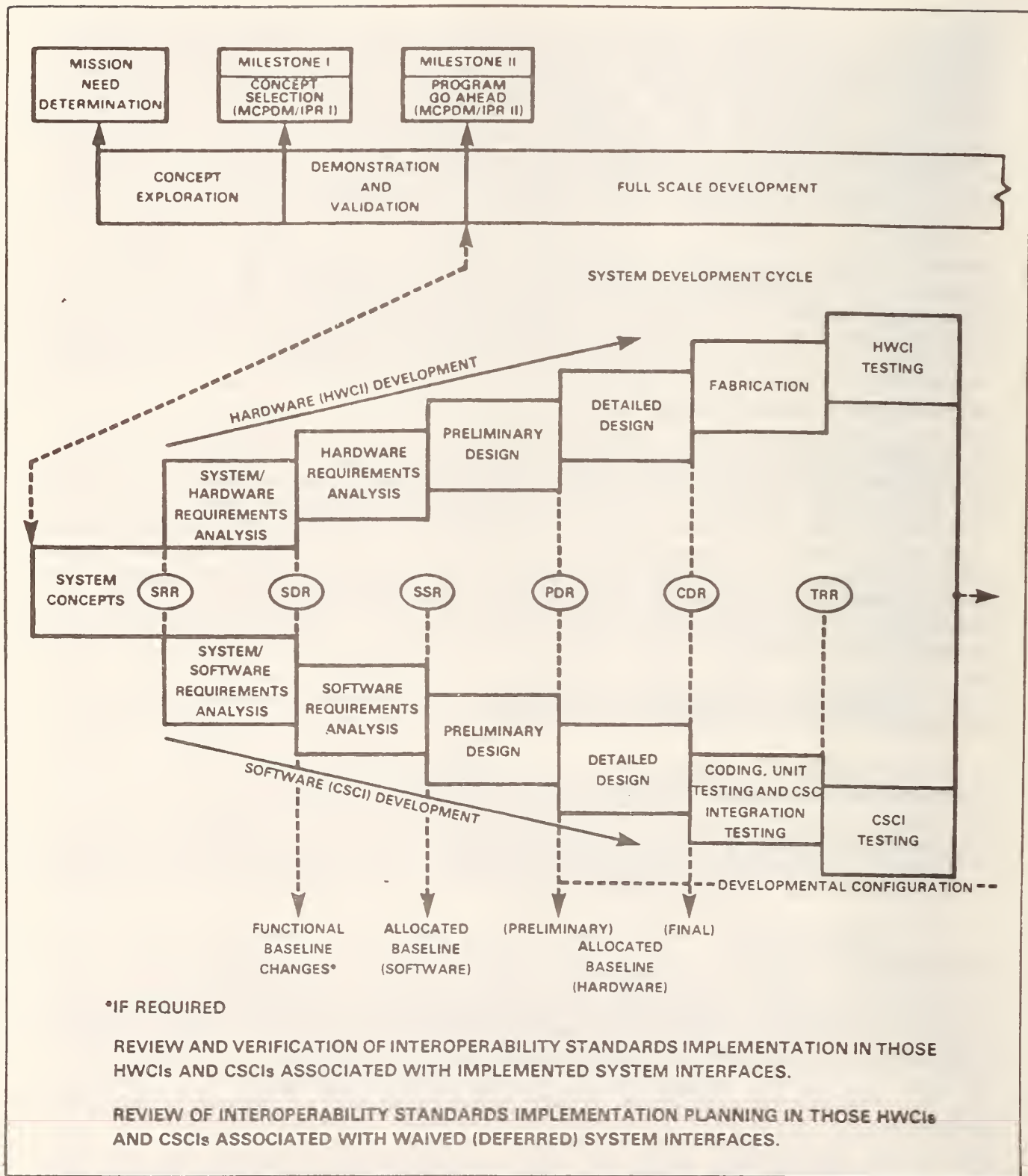


Figure 4-5.—Technical Reviews and Audits (Full Scale Development).

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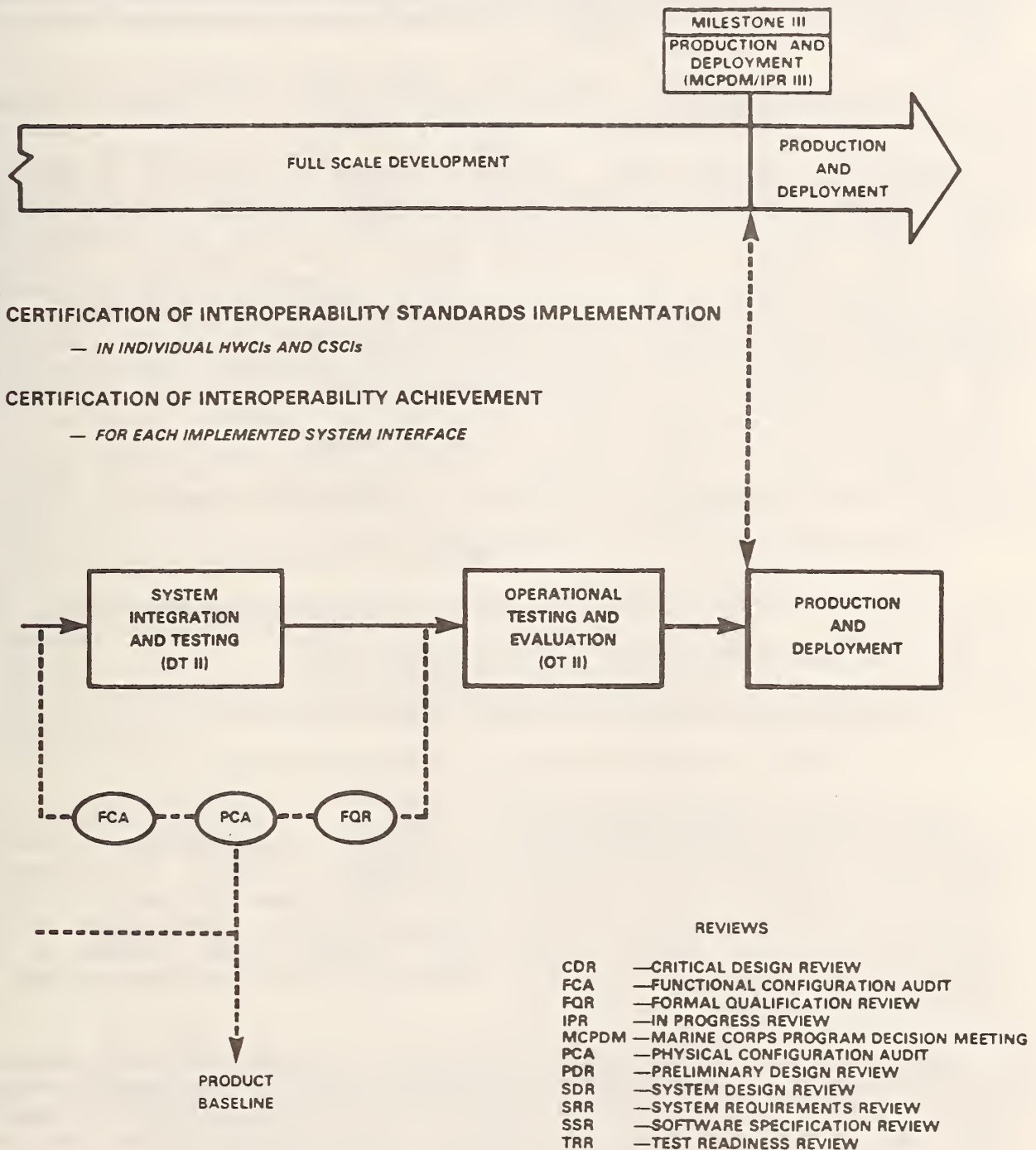


Figure 4-5.--Technical Reviews and Audits (Full Scale Development)--Continued.

h. Configuration Management Plans. The plans should reflect complete and accurate contractor understanding of CM relationships with the Government system CCB, USMC IPB, MCDEC ICCB, other interfacing system/equipment CCBs, and ICWG or ITRG participation, if any.

i. Milestone Schedules. Schedules should include interoperability testing and certification requirements for planning purposes.

2. System Design Review (SDR). The SDR is similar in purpose to the SRR, but covers system/equipment requirements in much greater detail. It is the final review before the contractor proceeds with HWCI design and detailed CSCI requirements analysis. It also should result in the contractor's validation and/or completion of the FBL, or raise ECPs or requests for waivers/requests for deviations (RFWs/RFDs) to that baseline for CCB evaluation. The contractor is also required to provide the documents below for Government review; the DPO will ensure that each is reviewed in detail. Preliminary IRSs will also be reviewed by other interfacing system/equipment DPOs, ASPOs, PDAs, and contractors, as appropriate. Other service sponsors should also be invited to review those IRSs related to their systems.

- a. System Specification (as revised, or with proposed changes).
- b. Development Specifications (if appropriate).
- c. Product Specifications (if system is entering production phase).
- d. Preliminary Operational Concept Document (OCD).
- e. Preliminary Software Requirements Specifications.
- f. Preliminary Interface Requirements Specification(s).

3. Software Specification Review (SSR). The SSR is a detailed review of the contractor-proposed final Software Requirements Specifications, Interface Requirements Specifications, and Operational Concept Document. Its purpose is to establish the ABL for the continued CSCI design (see 4001.3e(2)). If the system is complex, a number of SSRs may be required. The system DPO is responsible for the review of all CSCIs including those related to the implementation of message, data, and protocol standards and accomplishment of interface requirements.

4. Preliminary Design Review (PDR). The PDR is a formal technical review of the basic design of an individual configuration item or functionally related group of items. It includes the review of the final hardware development specifications and additional, more detailed software documentation. Approval of the development specifications establishes the hardware ABL. Because of the numerous design requirements being addressed (see Appendix D, MIL-STD-1521B), the PDR is an important review requiring full government participation. Deficiencies noted can still be corrected prior to completion of the product specifications and Critical Design Review (CDR). The system DPO is responsible

for review of contractor design documentation related to implementation of interoperability standards. See MIL-STD-1521B for detailed procedures.

5. Critical Design Review (CDR). The CDR is normally the last Government review prior to actual fabrication of hardware and coding of software/firmware. Of primary Government interest is the resolution of those design deficiencies noted in the PDR(s). Like the PDR, the CDR may be conducted in multiple meetings, depending on the system complexity and quantity/relationship of HWCIs and CSCIs. The PDA is responsible for conduct of the CDR.

6. Test Readiness Review (TRR). The TRR is a formal review of the contractor's readiness to begin formal software (CSCI) testing and occurs at a critical time in the development phase. The system DPO is responsible for reviewing TRR items and notifying the sponsor and CG, MCDEC (D101) of any interoperability testing or schedule impacts.

7. Audits and Formal Qualification. Two additional government audits (of the system functional and physical configurations) and a formal qualification review are normally required for government acceptance of TDSs. Because of their relationship to the interoperability certification process, these audits and the review are discussed in chapter 6.

8. Major Management Reviews. MCO 5000.15, Marine Corps Systems Acquisition Management Policy (reference (aa)), establishes guidelines for the conduct of systems acquisition reviews by the MCPDM or IPR Committee. These reviews are normally conducted at each acquisition decision milestone; these milestones are established by DoDD 5000.1, Major System Acquisitions (reference (bb)), and are as follows:

- o Milestone 0 - Decision for Program Initiation.
- o Milestone I - Decision to proceed into demonstration and validation phase.
- o Milestone II - Decision to proceed with full-scale development.
- o Milestone III - Decision to proceed with production and deployment.

a. The level of review and decision authority for each program is dependent on the acquisition category (ACAT) assigned. Most Marine Corps TDS/equipment acquisition programs fall into the ACAT IIC and III levels as shown in figure 4-6.

b. The Acquisition Program Sponsor is responsible for the presentation of all information for the review, including any critical issues. MCO 3093.1B also requires that the system sponsor indicate the degree of interoperability incorporated by specifying the interfaces and standards planned or incorporated in the TDS or equipment. Enclosure (2), System Interface Description, to MCO 3093.1B is the suggested format and is required at each milestone, or

otherwise as interface requirements change. Independent evaluations of the level of interoperability achieved by the TDS or equipment under review are required from the Director, C⁴ Systems Division and the Director, MCODEA, as appropriate. Decisions of both MCPDMs and IPR Committees are recorded in acquisition decision memorandums (ADMs), which are approved by the appropriate Marine Corps decision authority.

<u>ACAT</u>	<u>REVIEW LEVEL</u>	<u>DECISION AUTHORITY</u>	<u>DOLLAR THRESHOLDS (FY80 \$)</u>	
			<u>RDT & E, N</u>	<u>PMC/O & M, MC</u>
I	JRMB	SECDEF	\$200 M	\$1 B
II S	DNSARC	SECNAV	\$100 M	\$500 M
II C	MCPDM	CMC	\$5 - \$100 M	\$20 - \$500 M
III	IPR	ACMC	\$0 - \$5 M	\$0 - \$20 M
LEGEND				
DNSARC	—DEPARTMENT OF THE NAVY SYSTEMS ACQUISITION REVIEW COUNCIL			
IPR	—IN-PROGRESS REVIEW			
JRMB	—JOINT REQUIREMENTS AND MANAGEMENT BOARD			
MCPDM	—MARINE CORPS PROGRAM DECISION MEETING			

Figure 4-6.--Acquisition Categories.

c. Annual Progress Reviews. In addition to these major reviews, MCO 5000.15 requires that acquisition programs undergo annual progress reviews in those years when a major milestone review is not scheduled. Acquisition program sponsors are also responsible for these annual reviews and will notify CMC (CC) of system interface changes in accordance with MCO 3093.1B.

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CHAPTER 5

INTEROPERABILITY TESTING

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CHAPTER 5

INTEROPERABILITY TESTING

5000. INTRODUCTION. The previous chapter discussed interoperability implementation and verification procedures used to ensure that TDSs and interconnecting equipment are developed in accordance with interoperability requirements and standards. Once interoperability standards are imposed on systems and equipment, testing must be performed to verify that the equipment meets the interoperability standards form, fit, and function requirements. Systems and equipment that successfully implement the interoperability requirements and standards may be certified for use on Marine Corps and joint/combined interfaces. Interoperability testing should be accomplished within the existing acquisition and post deployment support functions (scheduled as part of Developmental Testing/Operational Testing (DT/OT)). There are testing procedures to support Marine Corps intraoperability requirements and similar procedures to support joint or combined interoperability requirements. In many cases the procedures are the same and execution of testing at a particular phase may satisfy both requirements. This chapter describes a formal interoperability test program that ensures approved interoperability standards have been implemented in a TDS and that system interfaces perform as specified. This chapter provides the test program concept, assigns test responsibilities, and describes critical interoperability test issues, test planning, test conduct, test reporting, and reviews. Finally, joint testing requirements are discussed.

5001. GENERAL TEST CONCEPTS. The overall concept (figure 5-1) for interoperability testing is contained in the following subparagraphs.

1. Types of Testing. The various types of interoperability tests are defined below.

a. Certification Testing--Testing that evaluates whether or not the TDS's implementation of one or more data link capabilities are technically compatible and interoperable and in accordance with the appropriate standards and requirements of the appropriate documents, including the Interface Design Document (IDD), Interface Requirement Specification (IRS), or Interface Design Specification (IDS). This testing supports the interoperability certification decision and includes message, data element, protocol conformance, and system level testing.

b. Requalification Testing--Testing conducted to ensure that systems certified for interoperability remain so following modifications, enhancements, or system software changes.

c. Revalidation Testing--Testing conducted to ensure that interface changes to other systems have not had an adverse effect on the system being tested. It is conducted on previously certified systems that have not under-

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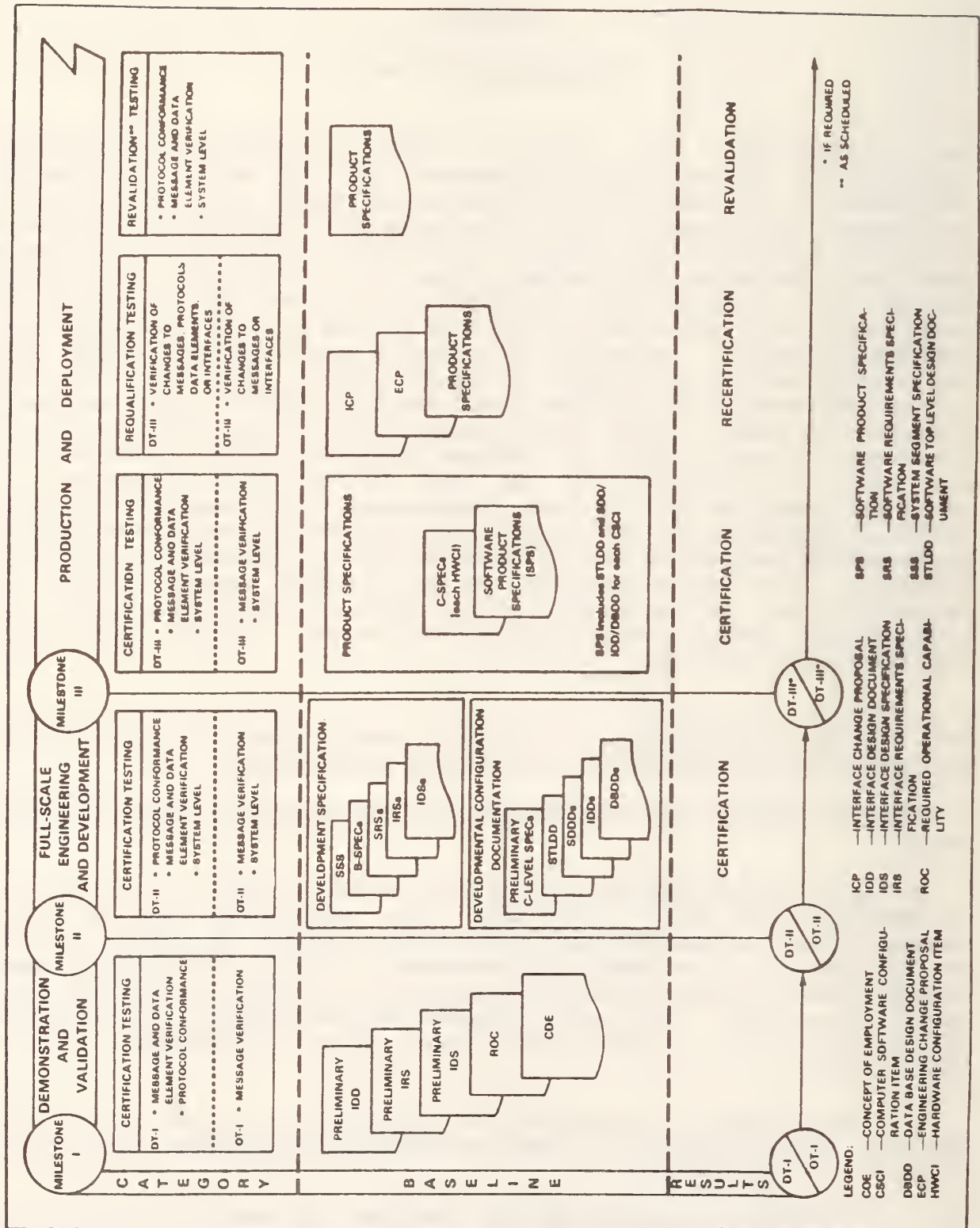


Figure 5-1.--Interoperability Testing.

gone a requalification or participated in at least three other system certification, requalification, or revalidation tests within an eighteen month period for joint/combined interfaces and as determined by the Director, C⁴ Systems Division, CMC (CC), for Marine Corps TDSs.

2. Interoperability Test Documentation. MCO 3093.1B assigns CMC (CC) the responsibility of approving formal TDS certification procedures and evaluating, at each decision milestone in the system acquisition process, the degree of interoperability incorporated into each TDS. Interoperability testing is managed by a series of plans developed by CG, MCDEC, Director, MCOTEA and the PDA under policies and guidance provided by CMC (CC and RD). These plans are discussed below. Responsibilities for planning and conducting tests, reporting results, and for retesting/requalification of interoperability are described in paragraph 4 of table 9-1. MCO 5000.11A, Testing and Evaluation of Systems and Equipment for the Marine Corps (reference (cc)), provides the detailed requirements for the Marine Corps test and evaluation program. Five documents used in test and evaluation are discussed below. Appendix D contains a checklist of interoperability items for each document. Chapter 5 serves as a supplement to MCO 5000.11A, providing additional guidelines for the preparation of these documents in order to include interoperability testing requirements.

a. Test and Evaluation Master Plan (TEMP)

(1) Purpose. The TEMP is a master plan for test and evaluation and is the management document which integrates the entire test and evaluation effort of an acquisition program. Its purposes are to direct and control accomplishment of test and evaluation; to identify all required T&E resources; to facilitate planning, programming, and budgeting; and to minimize redundant testing and RDT&E support requirements.

(2) TEMP Responsibilities. The CG, MCDEC/PDA with operational test input from the Director, MCOTEA, is responsible for the preparation of the TEMP.

(3) Supplemental Guidelines. The following discussion is based on the TEMP format contained in DoD Directive 5000.3, Test and Evaluation (reference (dd)). Only the paragraphs that are directly applicable to interoperability testing are addressed in this discussion.

(a) Interfaces. All interfaces to other systems must be listed and briefly described.

(b) Required Operational Characteristics. All key interoperability goals, derived from the ROC, Mission Area Analysis, or operational issues are to be listed.

(c) Required Technical Characteristics. Key technical characteristics and performance goals must be listed. These goals are derived from the requirements in the RDT&E Work Directive, the Acquisition Plan, ROC, or operational issues.

(d) Critical Test and Evaluation Issues. This section should contain a brief description of all critical interoperability test issues, such as mission performance, that must be addressed during testing.

(e) Developmental Test and Evaluation (DT&E) Outline. This section should contain a summary of any past or future DT&E efforts. Emphasis should be placed on interoperability test objectives and how they have been or will be achieved (brass-board, simulation testing, etc.).

(f) Operational Test and Evaluation (OT&E) Outline. This section should address achievements of interoperability test objectives and their contribution to the system's operational effectiveness.

(g) Special Resources Summary. All special interoperability test support requirements, such as test equipment and other systems required to test interfaces, are contained in this section.

b. Test Planning Document (TPD)

(1) Purpose. The TPD should be written sufficiently far in advance to permit timely funding submissions into the program objective memorandum (POM) cycle and the allocation of Fleet Marine Force resources.

(2) TPD Responsibilities. Since FMF personnel and equipment support are usually required only by the operational tester, the responsibility for the TPD is normally that of the operational tester. In rare cases, when there is a DT requirement for FMF personnel and fleet support, the developmental tester is also responsible for preparing a TPD.

(3) Supplemental Guidelines. Early developmental and operational tester involvement in the system acquisition process is employed to effectively implement interoperability testing. Both the operational tester and the developmental tester plan for limited FMF personnel and equipment support during the early-to-mid stages of the full-scale development phase. Periodic, three- to five-day tests are conducted at the contractor's facility by the developmental and operational testers to ensure that requirements are being met. Therefore, the TPD reflects resource requirements scheduled not only for the scheduled DT and OT, but also for early-on interoperability tests that are conducted at the contractor's facility.

c. Detailed Test Plan (DTP)

(1) Purpose. The DTP is used for directing every phase of a test, particularly the functions of test control, data collection, and data analysis. It is a complete plan for combining system mission, resources, test design, collection plan, analysis plan, and evaluation plan into a cohesive whole.

(2) DTP Responsibilities. Both the developmental tester and the operational tester are required to prepare a DTP for each DT and OT test that is to be conducted.

(3) Supplemental Guidelines. The following discussion is based on the DTP format presented in MCO 5000.11A. Only the format paragraphs that are directly applicable to interoperability testing are addressed in the following paragraphs.

(a) Test Objectives. Test objectives are derived from the CMC Research, Development, Test, and Evaluation, (RDT&E) Work Directive and the Acquisition Plan, or are derived from operational issues contained in the ROC, or Concept of Employment (COE). In programs that require interoperability testing, test objectives that address interoperability issues must be included. The interoperability objective of developmental testing is to evaluate the TDS's conformance to communications protocol specifications, message standards, formats, and data elements, while the objective of operational testing is to evaluate the network performance of communication protocols, physical interfaces, messages, and TDSs in an operational environment.

(b) Test Concept. The test concept for both DT and OT incorporates interoperability testing in all of its basic sections. As stated in MCO 5000.11A, this portion of the DTP includes a scenario section that describes OT scenarios based on operational requirements, a variable-conditions matrix section that summarizes the test design, an analysis procedures section that explains how the data is to be analyzed, and a data requirements section that summarizes the data requirements/data collection effort, including personnel requirements.

(c) Test Organization/Support. The developmental tester and the operational tester make provisions for technical personnel to be trained on the Marine Tactical System (MTS) Protocol Test System. The MTS Protocol Test System is a suite of test equipment that performs protocol conformance testing. The detailed requirements are contained in the Marine Corps Plan For Conformance Testing of Communications Protocols. The personnel operate the MTS Protocol Test System during DT and OT. The developmental tester and the operational tester may schedule a limited number of FMF personnel and equipment to support early test involvement (i.e., periodic 3- to 5-day tests) at the contractor's facility. Provisions are also made for performing other interoperability testing according to established procedures for DT and OT.

(d) Instrumentation. The MTS Protocol Test System is included in the summary for DT required instrumentation.

(e) Annex B, Scenario. OT-required operational scenarios are developed to obtain data with which to evaluate network performance. Collected data, for example, provides information on throughput versus Bit Error Rate/Block Error Rate (BER/BLER), throughput versus block size, network saturation conditions, and conditions leading to system degradation.

(f) Annex C, Test Design. The test design includes a listing and discussion of variables and conditions for the interoperability testing. Tests and experiments are based on statistical design, and have an associated data analysis plan.

(g) Annex D, Data Requirements/Collection Plan. This annex includes data requirements for interoperability testing and lists objectives and subobjectives, including the necessary measures of effectiveness and performance required for each of the subobjectives.

(h) Annex E, Instrumentation. This annex states the requirement for the MTS Protocol Test System for DT. It also designates who will provide this instrumentation support and for how long it will be required.

d. Test Report (TR)

(1) Purpose. The test report documents the results of DT and OT, and provides an analysis of those results.

(2) Test Report Responsibilities. The developmental and operational testers have the responsibility for preparing individual test reports for systems undergoing formal T&E.

(3) Supplemental Guidelines. The test report format for DT and OT is presented in MCO 5000.11A. In general, DT results reflect the data that are collected from addressing the objectives or subobjectives of subtests, whereas OT results reflect the data that are collected from addressing the data requirements listed under each operational test issue. The data collected from interoperability testing during DT and OT are appropriately analyzed and reported with the rest of the test data. The Test Report must clearly compare the system's implementation of messages, data elements and protocols versus the standards it was required to implement. Further, the test report must indicate the degree to which each interface performed as specified.

e. Independent Evaluation Report (IER)

(1) Purpose. The IER provides a record of the assessed limitations and adequacy of the data addressing the issues in the test. It also provides conclusions drawn for each addressed issue and objective, the evidence supporting these conclusions, the overall conclusions, and resulting recommendations.

(2) IER Responsibilities. The IER is required only for OT and OT portions of combined DT/OT. Therefore, the IER is solely the responsibility of the Director, MCOTEA.

(3) Supplemental Guidelines. The IER format is presented in MCO 5000.11A. The IER is primarily based on OT findings. It provides an independent, unbiased evaluation of operational issues including how well the interoperability requirements were met by the tested system. Comments and

recommendations pertaining to the operational test results relevant to interoperability certification must be addressed in the IER. This does not imply that MCOTEA certifies interoperability.

f. Marine Corps Interoperability Test Program. This document establishes procedures for performing Marine Corps interoperability testing. The program provides a verification methodology that can evaluate conformance of a developing or fielded system's software to the specified interoperability requirements and standards. The test equipment used to perform interoperability testing is referred to as the MTS Interoperability Test System. See paragraph 5002 for more detail regarding the program.

3. Critical Interoperability Test Items. Critical issues are those aspects of a system/equipment capability, either operational, technical, or other, that must be questioned before a system's overall worth can be estimated. They are of primary importance to the decision authority in reaching a decision to allow the system to advance into the next acquisition phase. The following areas are considered critical to the successful implementation and verification of interoperability requirements and standards.

a. Performance. Do the interfaces and protocols perform their intended functions as defined in approved requirements documents and specifications? Do the systems/equipment provide acceptable service to the user? Are messages transmitted correctly and in a timely manner?

b. Reliability, Availability, Maintainability (RAM). Do the TDS and interconnecting equipment components meet the RAM specifications?

c. Logistics Support. Has sufficient time been allocated to test interoperability requirements and standards? Have interoperability considerations been included in logistics support plans?

d. Compatibility. Are the interconnecting equipment components compatible and without mutual interference?

e. Training. Do training plans include provisions for any special training required by interoperability requirements?

f. Human Factors. Is the TDS/equipment safe to operate? Are equipment and operational procedures effectively and safely performed? Do they lend themselves to user-friendly operation?

5002. MARINE CORPS INTEROPERABILITY TESTING. MCO 3093.1B establishes the Marine Corps interoperability testing requirement. This requirement is further amplified by MCO 5000.11. Interoperability test and evaluation is conducted throughout the tactical data system's life cycle and is required to ensure that the system and/or interconnecting equipment perform as specified. The Marine Corps interoperability test program, through the use of the MTS Interoperability Test System at MCTSSA, provides that assurance. Inter-

operability testing begins following Milestone I with the verification of protocol conformance, messages, and data elements. It continues after Milestone II with addition of system level testing and following Milestone III where changes to interfaces made during production are tested. The results of interoperability testing provide the Director, C4 Systems Division (CMC (CC)), part of the data necessary to make an interoperability certification decision at Milestone III or to recertify/revalidate a system during its deployment phase.

1. THE INTEROPERABILITY TEST PROGRAM. The interoperability test program introduces a methodology that enables the Marine Corps to test the protocols and messages employed by Marine Corps TDSs and interconnecting equipment. The program provides for testing of the conformance of TDSs to appropriate standards as well as the means to evaluate the relative effectiveness of protocols prior to implementation by a particular TDS or interface. The MTS Interoperability Test System will support interoperability testing but is not intended to support testing of all functions specified for a TDS or for the interconnecting equipment. The interoperability test program, when fully operational, will perform the following functions:

a. Protocol conformance, message verification, data element verification, and system level interoperability testing.

b. Benchmark testing and modeling of proposed protocol standards to provide empirical data to be used as an aid in determining which protocol standards will be more efficient in a laboratory simulation of an operational environments.

c. Post deployment software interoperability testing.

d. Pretesting of Marine Corps TDSs and interface equipment prior to joint testing by JTC^{3A} test agencies.

2. INTEROPERABILITY TEST PLANNING. Interoperability test planning is based upon the test and evaluation procedures contained in MCO 5000.11, the acquisition milestones and test requirements of MCO P5000.10, and the policy guidance contained in MCO 3093.1B. Interoperability test planning for both Marine Corps and joint test requirements assures that the test program will generate sufficient data to satisfy the requirements of the decision makers who must recommend or grant interoperability certification. MCTSSA is responsible for the operation and maintenance of the MTS Interoperability Test System and must plan for interoperability testing, as required. If possible the test plan should provide for testing of both Marine Corps and joint interoperability requirements at the same time. However, testing of Marine Corps equipment should not be delayed if simultaneous joint testing is not possible. The TRR provides the PDA with an indication of the contractor's ability to begin software testing. The responsibilities for developing the TEMP, TPD, and DTP are contained in paragraph 5001.2. CMC (RD) approves the TEMP. Approval authority for the TPD and DTP depends on the type of testing

being conducted. The CG, MCDEC approves all TPDs and DTPs for DT and for OT of ACAT III programs. The Director, MCOTEA approves the TPD and DTP for OT of ACATs I and IIs programs, and those ACAT III programs designated for MCOTEA testing. If combined DT/OT is conducted, plans are approved by CMC (RD). Section 4A of table 9-1 outlines specific responsibilities for interoperability test planning. Figure 5-2 is a diagram of the interoperability detailed test planning process. The process illustrated is a generalized flow diagram for the processing of Detailed Test Plans. Amplifying comments are contained below.

a. Provide Interoperability Test and Evaluation Requirements for RDT&E Work Directive (Block 1). Interoperability test planning normally begins when CMC (CC) provides the interoperability test and evaluation requirements for inclusion in the RDT&E work directives to CMC (RD).

b. Provide Interoperability Test and Evaluation Guidance (Blocks 2 through 3a). CMC (RD), who has overall cognizance of the Marine Corps T&E Program, provides test planning guidance to MCOTEA, who must begin planning for OT, and also provides the work directive containing interoperability test guidance to the Development Center (system DPO). The system DPO will ensure that interoperability testing performed by MCTSSA using the MTS Interoperability Test System is planned for and scheduled as an integral part of DT and OT. The system DPO must then provide guidance to the PDA/contractor who, in return, furnishes proposed test plans to the system DPO. The system DPO also provides MCOTEA with information needed for OT planning.

c. Review of Detailed Test Plans (Blocks 2a, 3 through 6). The PDA/contractor and MCTSSA, if tasked, provide proposed DTPs to the Development Center (system DPO) for review. The plans are reviewed to ensure interoperability requirements are included, and are forwarded to the system sponsor for review and staffing. CMC (CC) will then review and concur in the plans, and forward combined DT/OT DTPs to CMC (RD), DT DTPs to MCDEC and OT DTPs to MCOTEA for approval. DTPs will not be approved without CMC (CC) concurrence.

d. Developmental Testing (Blocks 3a, 6, and 8). The approved DT DTPs are provided to the PDA/contractor by the system DPO and developmental testing begins. MCTSSA, if directed, may assist the PDA/contractor in the conduct of DT&E. MCTSSA may also be tasked to evaluate DT&E by the Director, Development Center.

e. Operational Testing (Blocks 7 and 9). The approved OT DTPs are provided to MCOTEA and planning for OT continues. OT, planned by MCOTEA and conducted by the FMF, begins upon satisfactory completion of DT&E and CG, MCDEC certification that the test item is safe and ready for OT.

3. INTEROPERABILITY TEST CONDUCT. Actual testing to ensure interoperability standards are being implemented is normally conducted within the framework of existing Marine Corps test and evaluation programs. This includes testing of system/equipment protocols, message formats, and data

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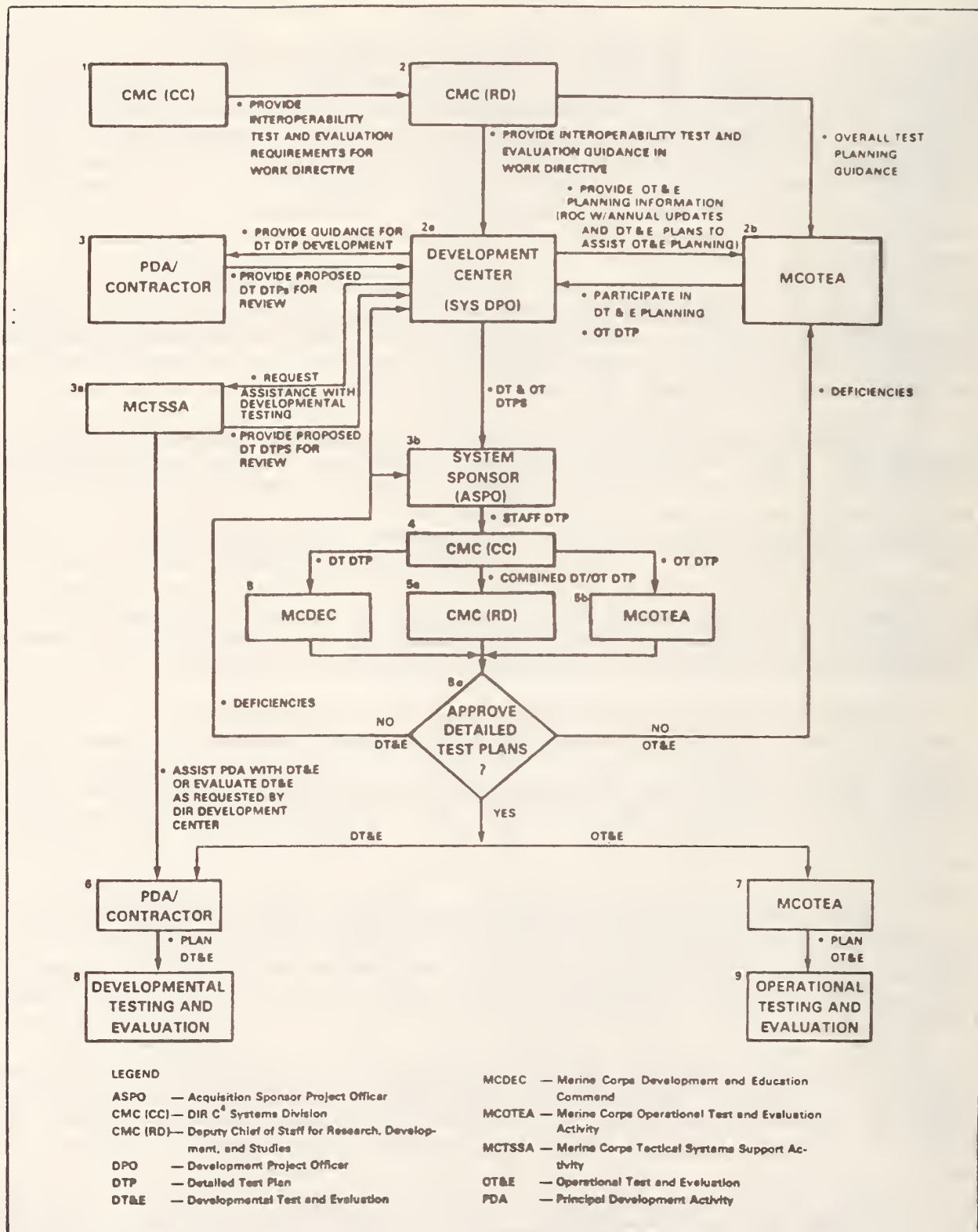


Figure 5-2.—Interoperability Detailed Test Planning Process

elements to ensure they are in consonance with published standards. Unprogrammed or unforeseen certification test requirements are addressed on an individual basis. Ideally, both Marine Corps and joint interoperability test requirements, if applicable, are tested simultaneously. If this is not possible, Marine Corps TDSs and interconnecting equipment will be tested first, followed by appropriate joint testing at a later date. CG, MCDEC is responsible for planning, conducting, and reporting DT&E except when a PDA plans, conducts, and reports DT&E as mutually agreed by CG, MCDEC and the PDA. The DPO actually carries out this responsibility and coordinates closely with the PDA when required. MCTSSA is called upon to support, perform or supervise the conduct of interoperability testing during developmental testing using the MTS Interoperability Test System. The Director, MCOTEA is responsible for operationally testing the interoperability requirements that are identified in the ROC and concept of employment. This action will be applicable to all ACAT I, ACAT IIS, ACAT IIC, and those ACAT III programs designated for MCOTEA testing. Section 4B of table 9-1 outlines specific responsibilities for interoperability testing.

a. Certification Testing. Certification testing generally is conducted as an integral part of DT and OT. CMC (CC) may direct a certification test apart from DT/OT if DT/OT results do not provide sufficient information to reach an interoperability certification decision. MCTSSA may be requested to assist in DT or CMC (CC) directed certification testing.

(1) DT/OT Testing. During DT-I, protocol layers 0-7 are tested for conformance and messages verified to the maximum extent practicable using brass-board models or simulations. In DT-II these tests are repeated on either system/equipment pre-production prototypes or pilot production models. System level testing of all interoperability requirements is also performed. OT-I is essentially a feasibility study in which the requirements of the system are examined and a determination made as to the system's ability to meet the requirements. OT-II involves the testing of the system's interfaces and exchange of messages under operational conditions.

(2) Testing Baseline. The testing baseline for DT-I, if conducted, is the preliminary development specifications, including commercial specifications, preliminary prime or critical item specifications and preliminary SRSSs, IRSSs, or IDSSs. Baseline documentation for DT-II would include all system, HWCI and CSCI development specifications and design documents. DT-III, if conducted, would use the complete set of product specifications as the test baseline. The principal documents supporting protocol, message and data element certification would be the various IRSSs, IDDs or IDSSs. DT-III will only include tests of deferred interfaces or correction of deficiencies found in DT-II. The Test Support Package (TSP) and ROC provide the basic guidance for the DPT for OT-II. OT III is required if the production version of the TDS/equipment differs significantly from that tested in OT-II.

b. Regualification Testing. Marine Corps regualification testing may occur during DT-III or OT-III, or thereafter. The baseline for requalification testing includes the product specifications and the approved ICP/ECP that affects protocol, data or message standards, or system performance. Under the overall cognizance of CMC (LM) and CG, MCDEC (D06), MCTSSA, or other designated postdeployment software support activities (PDSSAs), ensure that product improvements and software modifications to fielded systems are accomplished in accordance with existing inter/intraoperability standards during the system/equipment life cycle. Successful regualification testing may result in recertification of interoperability for a tactical data system. Section 4E of table 9-1 outlines specific interoperability retest and regualification responsibilities. The interoperability regualification process is shown in figure 5-3. The following subparagraphs expand on the process depicted.

(1) Origination of ICPs and ECPs (Block 1). ICPs and ECPs may be initiated by any participant involved in the development, testing, or operational employment of Marine Corps TDSs. ICPs/ECPs may result from the problems identified in the course of testing or operational use of the system. The system sponsor ensures ICPs are prepared if changes to a system's interoperability requirements or standards are warranted. These ICPs must receive CG, MCDEC (D06) or CMC (CC) approval before further action. Procedures for the preparation, submission, and processing of ICPs are contained in the MCICMP. The procedures for processing ECPs are contained in MCO 4130.5, Marine Corps Configuration Control Procedures.

(2) Review, Analysis, Evaluation, Development and Test of ICPs/ECPs (Blocks 2 through 3a). CMC (LM) forwards the proposed change to the appropriate PDSSA or contractor for development. If the PDSSA is not MCTSSA, the contractor or designated PDSSA forwards the change to MCTSSA for testing. MCTSSA tests all proposed program changes and provides test results to CMC (LM), CMC (CC), CG, MCDEC (D101), and the system sponsor.

(3) Evaluation of Test Results and Recertification Decision (Blocks 4 through 4b, 5, and 5a). The results of the regualification tests are evaluated by CG, MCDEC (D101) and the system sponsor. Each provides an evaluation of the results and a recommendation for interoperability recertification to CMC (CC) who makes the interoperability recertification decision. CMC (CC) may convene an IPB to provide a recertification recommendation. If the change is not acceptable, CMC (LM) provides the noted deficiencies to the appropriate PDSSA/contractor or MCTSSA for resolution. If the decision is to recertify, CMC (LM) notifies MCTSSA.

(4) Promulgation of the Approved Modification (Blocks 6 and 7). Upon receipt of the recertification decision, MCTSSA forwards the approved program modifications to TDS users for implementation.

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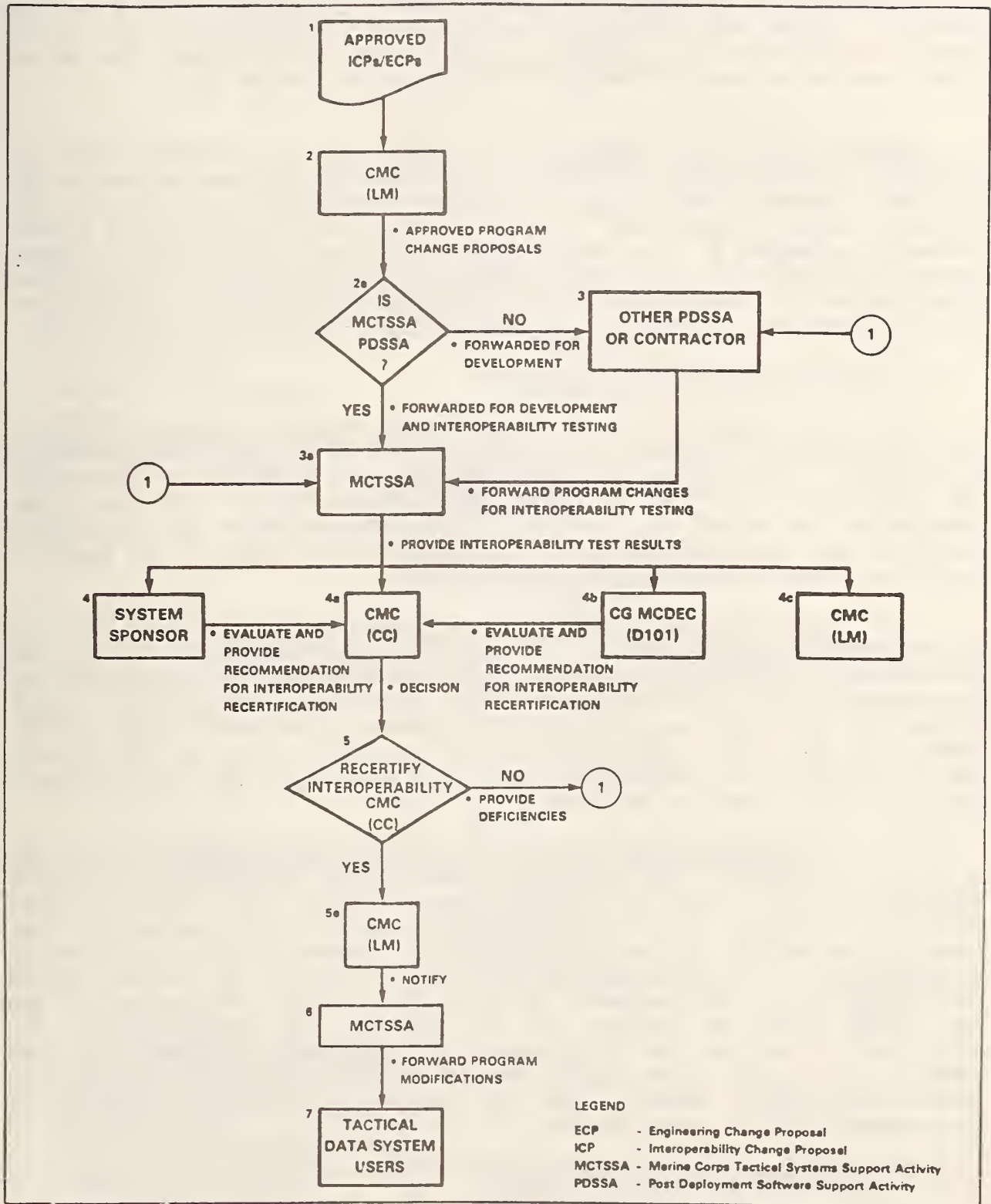


Figure 5-3.--Interoperability Requalification Testing Process.

c. Revalidation Testing. Marine Corps revalidation testing is conducted on fielded systems by MCTSSA using the product specification as a testing baseline. System level testing is conducted and a determination made as the system's performance with respect to its product specification. The Marine Corps revalidation testing schedule is determined by the CMC (CC).

4. INTEROPERABILITY TEST REPORTING. Test reporting is conducted within the framework of existing Marine Corps test and evaluation programs and acquisition policies. Successful completion of interoperability testing provides CMC (CC) the data needed to support the interoperability certification decision process discussed in Chapter 6. Test reports must contain sufficient detail to demonstrate interoperability has been achieved. Figures 5-4 and 5-5 are generalized flow diagrams that are explained in the succeeding paragraphs. Interoperability test reporting responsibilities are outlined in section 4C of table 9-1.

a. DT Test Report Flow (Figure 5-4)

(1) Developmental Test Guidance, Conduct and Data (Block 1 and 1a). The PDA/contractor is responsible for the conduct of DT under the supervision of CG, MCDEC. DT planning guidance, schedule, and direction is provided by the PDA/contractor to the DT tester who performs the DT. DT test data, obtained by the tester, is forwarded to the PDA/contractor for evaluation, consolidation, and interpretation. The processed test data is the basis of the DT Test Report written by the PDA/contractor.

(2) Distribution of DT Test Reports (Blocks 1a, 2, 3 through 3f). The PDA/contractor provides the DT test reports to the members of the FCA and Formal Qualification Review (FQR) for use in evaluating the interoperability incorporated into the TDS/equipment. Test reports are also provided to the system DPO for forwarding to the system sponsor, Development Center (D101), MCOTEA, and CMC (RD). The system sponsor provides a copy of the DT test report to Acquisition Coordinating Group (ACG) members and CMC (RD) provides a copy of the test report to CMC (CC).

(3) Evaluation of Test Reports, Recommendations, Comments (Blocks 1b, 2, 2a, 3, 4, and 5). The FCA/FQR reviews the DT test reports and other evaluation criteria, such as developmental and final draft specifications, waivers, deviations, official minutes, and separate interoperability test reports from MCTSSA, if any, and makes an interoperability certification recommendation. If the recommendation is not to certify, the FCA/FQR reports deficiencies to the PDA/contractor for corrective action. The Chairman of the FQR, based upon the minutes of the FQR/FCA and recommendations for certification, provides the interoperability certification recommendation and official FQR minutes to the system DPO for forwarding to Development Center (D101), the system sponsor, and CMC (LMA-2) who provides comments on supportability to the system sponsor.

b. OT Test Report Flow (Figure 5-5)

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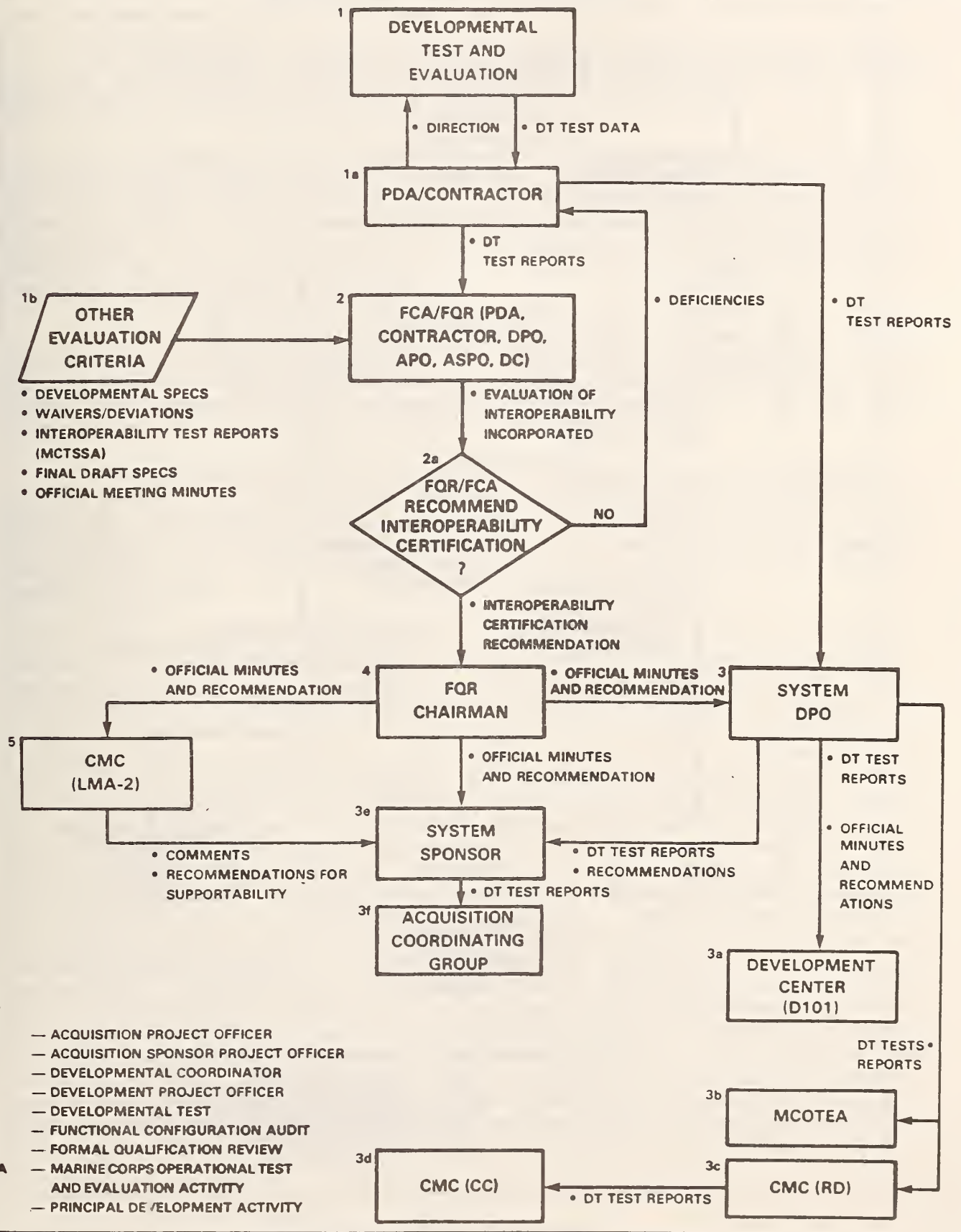


Figure 5-4.--DT Test Report Flow

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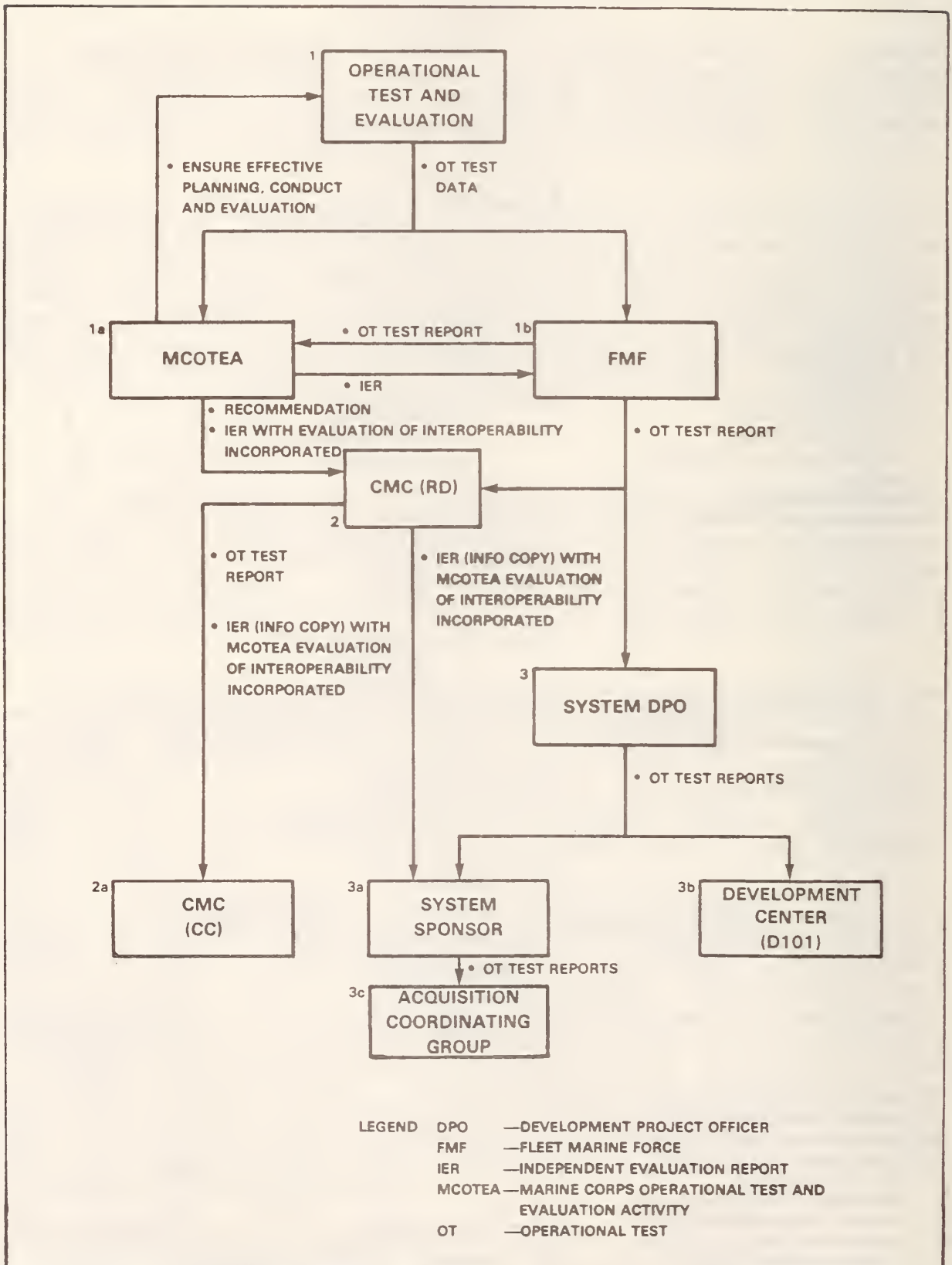


Figure 5-5.--OT Test Report Flow

(1) Operational Test Guidance and Direction (Blocks 1 and 1a). MCOTEA provides the guidance necessary for the effective planning, conduct, and evaluation of operational test and evaluation.

(2) Evaluation of OT Test Data (Blocks 1, 1a, and b). Test data collected is provided by the FMF testing unit to MCOTEA. The data is used by the FMF to write the OT test report and by MCOTEA to develop the IER. The Director, MCOTEA ensures that comments and recommendations pertaining to operational test results relevant to interoperability certification are addressed in the operational test IER. This does not imply that MCOTEA certifies interoperability requirements.

(3) Distribution of the IER (Blocks 1a, 1b, 2, 2a, and 3a). MCOTEA provides the IER (with an evaluation of interoperability incorporated) to the FMF and CMC (RD). CMC (RD) provides an information copy of the IER with the MCOTEA evaluation of interoperability incorporated to CMC (CC). CMC (RD) also provides the IER to the system sponsor.

(4) Distribution of OT Test Reports (Blocks 1b, 2, 2a, 3 through 3c). The FMF writes the OT Test report and distributes copies to CMC (RD) and the system DPO. CMC (RD) provides a copy of the OT test report to CMC (CC) while the system DPO provided copies to the system sponsor and the Development Center (D101). The system sponsor provides copies of the OT test report to members of the ACG.

5003. JOINT INTEROPERABILITY TESTING. JTC^{3A} Circular 9002, Interoperability Certification of Tactical C³I Systems and Equipment Interfaces, implements a joint interoperability certification program to ensure interoperability of C³ systems and equipment, which are employed in support of joint or combined operations, and supports the policies established by references (f), (h) and (i). This circular provides for the testing and certification of tactical C³ systems and equipment with joint and combined technical and procedural interfaces. Generally, technical interfaces equate to physical layer protocols; procedural interfaces equate to higher layer protocols and joint message standards. The JTC^{3A} will recommend certification of Marine Corps TDSs and equipment for use in joint and combined operations for those technical and procedural interfaces that are tested and meet standards for joint and combined interfaces. Technical and procedural interface certification will be granted by the JCS based on test results and recommendations provided by the JTC^{3A} and DoD components, including the Marine Corps. Certification testing is conducted after Milestones II and III during the acquisition process and is performed by the designated responsible test organization and the service sponsoring the system. MCO 3093.1B assigns CMC (CC) cognizance for Marine Corps participation in joint testing and certification while CG, MCDEC publishes the overall test programs and plans under which the specific documents are developed. Responsibilities for planning and conducting tests, reporting results, and for retesting/requalification of interoperability are similar to those previously described for

Marine Corps interoperability testing in paragraph 5002. JTC^{3A} Circular 9002 contains specific information concerning Marine Corps responsibilities for joint interoperability testing and certification. Marine Corps responsibilities are highlighted below and outlined in table 9-1.

1. Joint Test Planning. The procedures previously listed in paragraph 5002.2 apply, except that JTC^{3A} has been given the responsibility by DoD of determining if a system is a candidate for joint/combined use and, therefore, must be interoperable in joint/combined operations. Accordingly, if a Marine Corps-developed system is assigned to this category, all test and certification planning documents including the Test and Evaluation Master Plan, test planning documents, and detailed test plans are subject to review by JTC^{3A}. The Five Year Interoperability Assurance Plan (FYIAP) is a major joint interoperability planning document. It documents the consolidated interoperability test requirements and the resources necessary to accomplish the tests. The FYIAP is prepared and issued annually by JTC^{3A} based on input from the services. CMC (CC) provides Marine Corps FYIAP input to JTC^{3A}. JTC^{3A} circular 9002 contains detailed information on the FYIAP. Section 4A of table 9-1 outlines specific Marine Corps responsibilities for joint test planning.

2. PROCEDURE FOR SUBMISSION OF MARINE CORPS FYIAP REQUIREMENTS. The Marine Corps participates in the FYIAP process by developing Marine Corps requirements for joint testing, developing test resource requirements, reviewing FYIAP documents, and through membership in the FYIAP Planning Group and the Joint Working Group. Marine Corps input for the FYIAP is developed by the Development Center (TACSIIP and system DPOs), MCTSSA, and MCOTEA. The consolidated FYIAP requirements are provided to CMC (CC) by CG, MCDEC (D101) for forwarding to the JTC^{3A}. The Marine Corps FYIAP development and review process is shown in figure 5-6 and discussed in the following subparagraphs. Additional information concerning the FYIAP can be found in JTC^{3A} Circular 9002.

(a) Request for FYIAP Test Requirements (Blocks 1, 3, and 4). In April of each year, the JTC^{3A} requests joint interoperability test requirements from CMC (CC) who, in turn, requests the information from CG, MCDEC (D101). CG, MCDEC (D101) requests each DPO and MCTSSA to provide FYIAP test requirements for joint procedural and technical interface testing as well as USMC testing requirements requiring use of joint test facilities.

(b) Development of USMC FYIAP Joint Test Requirements (Blocks 3, 4, 5, 5a, 7, and 8). Each system DPO develops joint test requirements for inclusion in the FYIAP. In addition, unique Marine Corps test facility requirements are also provided if joint test facilities are to be used in Marine Corps testing of the TDS or interconnecting equipment. Close coordination is maintained between the system sponsor and DPO to ensure all test requirements are coordinated and included. MCTSSA also develops FYIAP test requirements, including requalification and revalidation test requirements, for systems under its cognizance as a PDSSA. All proposed FYIAP test requirements are provided to CG, MCDEC (D101) who compares the input against documented Marine

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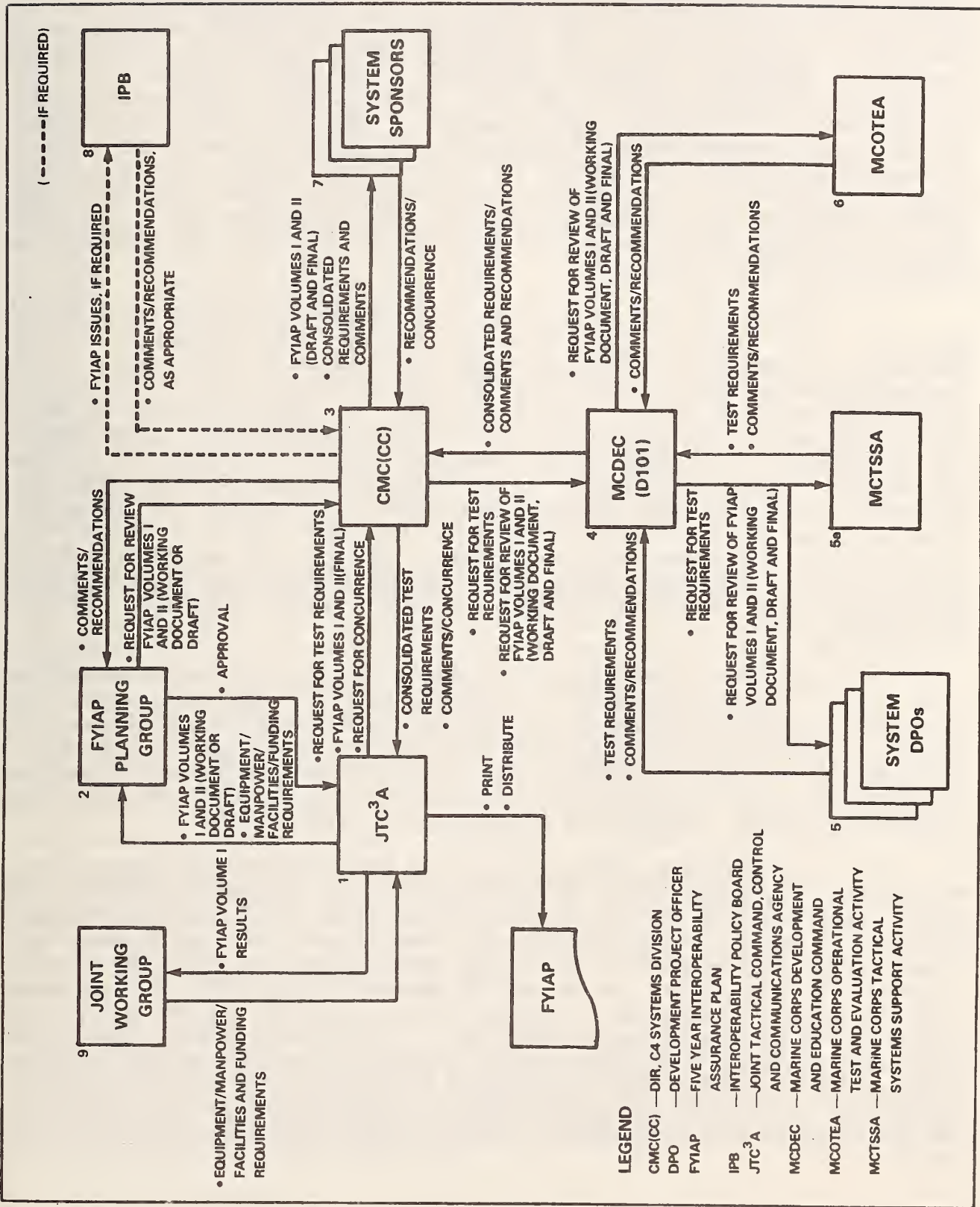


Figure 5-6.--FYIAP Development and Review Process.

Corps interoperability requirements contained in the Technical Interface Concepts (TIC). Testing requirements are consolidated and forwarded to CMC (CC) for further action. The format for test requirement submissions is depicted in appendix E. (CMC (CC) may request FYIAP input from the FMF as it relates to operational systems, interfaces or equipment strings. The FMF response would be provided to CMC (CC) for inclusion in the Marine Corps consolidated FYIAP test requirements package.) CMC (CC) reviews the package and provides the consolidated requirements to the system sponsors for review, recommendations, and concurrence. If FYIAP issues arise, an IPB may be convened by CMC (CC) in accordance with the MCICMP to review the issue(s) and provide comments and recommendations, as appropriate, to CMC (CC). The consolidated requirements package is forwarded to the JTC^{3A} for inclusion in Volumes I and II of the FYIAP.

(c) Request for USMC Concurrence of FYIAP Volume I (Blocks 1, 2, 3, 4, and 6). Each June the JTC^{3A} provides the new FYIAP Volume I working document to the FYIAP Planning Group for review. (The Marine Corps representative to the Planning Group is provided by CMC (CC).) The Marine Corps Planning Group member, through CMC (CC), provides the FYIAP Volume I working document to CG, MCDEC (D101) for review, comment, and recommendation for concurrence. CG, MCDEC (D101) requests similar information from the system DPOs, MCTSSA, and MCOTEA if the working document differs from the previously submitted requirements. Based upon that review and subsequent Planning Group meeting, the JTC^{3A} prepares the FYIAP Volume I (Draft) for Planning Group review and approval in July. CMC (CC) may request CG, MCDEC (D101) review of the draft Volume I, if necessary. The same process occurs each August when the JTC^{3A} provides the final Volume I to CMC (CC) for concurrence.

(d) Review of FYIAP Volume I (Blocks 5, 5a, and 6). DPOs review the FYIAP Volume I working document to determine that all USMC requirements are included. MCTSSA performs a similar review. MCOTEA reviews the document to ensure no duplication of MCOTEA operational testing is included in the FYIAP. All comments are then provided CG, MCDEC (D101). The same review process is completed each July and August when the draft and final Volume I documents are staffed for review. Comments are provided to CG, MCDEC (D101).

(e) Consolidation of Requirements and USMC Concurrence (Blocks 3, 4, 7, and 8). CG, MCDEC (D101) consolidates all USMC comments concerning the draft FYIAP Volume I and provides a recommendation for concurrence/nonconcurrency to CMC (CC). CMC (CC) provides the Volume I working document and consolidated comments received to the appropriate system sponsors for review, comment, and concurrence. An IPB may be convened by CMC (CC) in accordance with the MCICMP, if required, to discuss FYIAP issues and provide appropriate comments and recommendations to CMC (CC). Upon concurrence by the system sponsors, the CMC (CC) representative to the Planning Group, presents the USMC comments and recommendations to the FYIAP Planning Group. The same consolidation and concurrence procedure occurs in July and August when CMC (CC) provides Marine Corps concurrence on the draft and final FYIAP Volume I to the JTC^{3A}.

(f) Development of FYIAP Volume II Test Resources Requirements (Blocks 1, 2, and 9). The JTC^{3A} provides FYIAP Volume I (final), Test Requirements, to the Joint Working Group each September. The Joint Working Group, with USMC representation provided by CG, MCDEC (D101), and with contractor support as required, reviews the manpower, facilities, and equipment requirements developed in April as part of the FYIAP test requirements submission. The Joint Working Group provides the manpower, equipment, and facilities requirements to JTC^{3A} for review and approval by the FYIAP Planning Group. Upon Planning Group approval of these requirements, the Marine Corps Joint Working Group representative reviews the previously developed funding requirements and presents them to the JTC^{3A} in November. (The Marine Corps funding requirements are not subject to approval by the FYIAP Planning Group). The JTC^{3A} develops the draft of FYIAP Volume II using the inputs from the Joint Working Group.

(g) Request for Concurrence of FYIAP Volume II (Blocks 1, 2, 3, 4, and 6). Annually each December, the JTC^{3A} presents the draft of Volume II to the FYIAP Planning Group for review and approval. The Marine Corps Planning Group member, through CMC (CC), provides a copy of the Volume II Draft to CG, MCDEC (D101) for review, comment and recommendations. CG, MCDEC (D101) provides a copy of the draft to the system DPOs, MCTSSA, and MCOTEA for review and comment. The same procedure is followed in January when the JTC^{3A} furnishes CMC (CC) the final version of the FYIAP, Volume II.

(h) Review of FYIAP Volume II (Blocks 5, 5a, and 6). The system DPOs, MCTSSA, and MCOTEA review the contents of the draft Volume II for completeness and accuracy based upon the contents of Volume I. They provide comments and recommendations to CG, MCDEC (D101) for consolidation. The same process is employed each January when the final Volume II document is staffed for review.

(i) Consolidation of USMC Comments and USMC Concurrence (Blocks 3, 4, 7, and 8). CG, MCDEC (D101) consolidates all comments received and provides the comments and recommendation for concurrence/nonconcurrence to CMC (CC). CMC (CC) furnishes the draft Volume II and the consolidated comments to the system sponsors for review and concurrence. An IPB may be convened by CMC (CC) in accordance with the MCICMP, if required, to discuss FYIAP Volume II issues and to provide recommendations to CMC (CC). Upon review of all comments and recommendations, the CMC (CC) representative to the Planning Group presents the Marine Corps comments and recommendations on the draft Volume II to the Planning Group. The same actions occur when the final Volume II is staffed for concurrence in January, except that CMC (CC) provides comments/concurrence to the JTC^{3A}, which then issues the FYIAP.

3. Joint Testing. Normal DT and OT responsibilities, as outlined in paragraph 5002.3, apply for joint testing. The exception is that JTC^{3A} representatives are present for witnessing and observing tests. JTC^{3A} Circular 9002 contains detailed information on joint technical and procedural interface testing. Marine Corps responsibilities related to joint testing are outlined in section 4B of table 9-1.

a. Certification Testing. Technical interface certification testing is conducted by service test organizations, JTC³A, or other organizations designated as the responsible test organization (RTO) in the FYIAP. Procedural interface certification testing is conducted by the Joint Interface Test Force (JITF) and Service/Agency participating test units (PTU) activated for the scheduled testing. PTUs are also identified in the FYIAP.

b. Regualification Testing. Responsibilities described for Marine Corps regualification testing of systems are applicable for regualification testing of Marine Corps systems with joint and combined interfaces. Joint regualification testing is required for procedural interfaces following system software changes to ensure that the system remains interoperable and compatible. The systems requiring regualification testing will be identified and availability reported in the FYIAP. Regualification testing is conducted by the JITF and Service/Agency PTUs identified in the FYIAP.

c. Revalidation Testing. Revalidation testing will be scheduled in the FYIAP and is required for each certified system that has not undergone a regualification or participated in at least three other system certification, regualification, or revalidation tests during an eighteen month period. Revalidation testing is applicable to procedural interfaces and is conducted by the JITF and PTUs identified in the FYIAP.

4. Joint Test Reporting. The test reporting responsibilities indicated in paragraph 5002.3 apply to joint testing except that, as indicated in table 9-1, test reports are also made to JTC³A. The JTC³A prepares an Interoperability Assessment Report (IAR) for technical interfaces. The IAR contains information on technical interface testing and is provided to the Organization of the Joint Chief of Staff (OJCS (C³S)). Procedural interface test results are reviewed by the Joint Analysis Review Panel (JARP). The minutes of the JARP and the recommendations of JTC³A, the services, and the CINCs for interoperability certification are provided to the OJCS (C³S).

INTEROPERABILITY MANAGEMENT PLAN

CHAPTER 6

INTEROPERABILITY CERTIFICATION

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INTEROPERABILITY MANAGEMENT PLAN

CHAPTER 6

INTEROPERABILITY CERTIFICATION

6000. INTRODUCTION. This chapter describes Marine Corps and joint interoperability certification. Interoperability certification is based upon test reports and the results of audits and reviews. Chapter 5 addressed interoperability testing and reporting. This chapter discusses certification actions, audits, responsibilities, and critical interoperability items to be considered prior to certification. All interoperability requirements must be satisfied prior to certification. It is important to note that verification is a process, whereas certification is a statement of interoperability achievement, based upon results of the verification process.

6001. MARINE CORPS INTEROPERABILITY CERTIFICATION. Interoperability certification is required to ensure that the messages, data elements, and protocols employed in Marine Corps TDSs and interconnecting equipment are in accordance with the appropriate standards and specifications. Interoperability certification is also required to ensure that messages, data elements, and protocols used by TDSs on joint or combined interfaces have been implemented in accordance with the appropriate specifications. Based upon the satisfactory resolution of critical interoperability certification issues, the interoperability results achieved during testing, and the results of Functional Configuration Audits and Formal Qualification Reviews, the system sponsor and the CG, MCDEC (D06) provide recommendations and evaluations to CMC (CC), who makes the interoperability certification decision. The entire process culminates with a certification statement that the interoperability requirements have been met.

1. Interoperability Certification Statements. CMC (CC) reaches a certification decision for each of a TDS's required interfaces. One of three possible certification statements is issued for each decision. The types of statements and their significance follows:

a. Certified. A decision to certify an interface allows a TDS to go to production with the software and hardware for that interface in their present configuration. Note, however, that this does not represent or imply a production decision.

b. Certified with Qualifications. A decision to certify, with qualifications, an interface allows a TDS to go to production with the software and hardware for that interface in their present configuration, but requires the sponsor to resolve the qualifications and make a production model of the TDS available for retesting and recertification. Again, this does not represent or imply a production decision.

c. Not Certified. A decision to not certify an interface may prevent a TDS from going to production with its current configuration (if any) of

software and hardware for that interface. However, the TDS could be allowed to go to production with the certified interfaces only. For those interfaces not certified, the sponsor must resolve the issues and make the TDS available for testing, or retesting and certification. The interfaces must be certified by CMC (CC) prior to the TDS participating on the interface in an operational setting.

2. Critical Interoperability Certification Issues. The following items are considered of major importance in evaluation of factors leading to certification.

a. Mission Performance. Do the Marine Corps and/or joint interfaces perform their intended functions as defined by approved requirements? Are messages transmitted correctly and in a timely manner? Do the messages satisfy the information needs of the user?

b. Survivability/Vulnerability. Are the interoperability components (interfaces/software) at least as survivable as the systems they support?

c. Reliability, Availability, and Maintainability. Do components meet RAM specifications as stated in approved documents? Are the specifications adequate to ensure achievement of interoperability requirements and equipment availability?

d. Logistics Support. Are adequate repair parts for interfaces available? Do integrated logistics support plans include interoperability requirements?

e. Doctrine. Do the interoperability requirements conform to doctrine and results of mission area analyses?

f. Compatibility. Are the interconnecting equipments compatible with the systems/equipment and environment in which they will operate?

g. Training. Do training plans include any special interoperability training requirements to permit maximum use of the system?

h. Human Factors. Is the TDS and interconnecting equipment safe to operate? Does equipment lend itself to user friendly operation?

3. Acquisition Audits, Review and Actions. The audits and review that support the certification decision are discussed below:

a. Functional Configuration Audit

(1) The objective of the FCA is to verify that each configuration item's actual performance complies with its hardware development specifications or software requirements specifications and interface requirements specifications. It involves the detailed review of hardware and software test data and is a prerequisite to Government (PDA) acceptance of the configuration item. The FCA for a complex configuration item may be conducted on a

progressive basis, when so specified by the contracting agency, throughout the configuration item's development and culminates at the completion of the qualification testing of the configuration items with a review of all discrepancies at the final FCA. The FCA shall be conducted on that configuration of the item that is representative (prototype or preproduction) of the configuration to be released for production of the operational inventory quantities. When a prototype or preproduction article is not produced, the FCA shall be conducted on a first production article. For cases where configuration item qualification can only be determined through integrated system testing, FCAs will not be considered complete until satisfactory completion of such testing.

(2) The contractor is responsible for conduct of the FCA; FCA contractual requirements are the PDA's responsibility. Members of the ACG monitor the conduct and results of the FCA. In accordance with MCO 4130.7, formal recommendations regarding the successful completion of the FCA are the responsibility of the APO, assisted by CMC (LMA-2). Approval/disapproval of the FCA minutes is the responsibility of the acquisition program sponsor. For hardware items, the system DPO will assist the APO in ensuring the FCA is properly conducted for both development and production items. For software, CG, MCDEC will ensure that MCTSSA or the appropriate designated PDSSA participates in the audit. Appendix C contains an interoperability issue checklist for use at an FCA. MCO 4130.1A, Configuration Management (reference (ee)), DoD Standard 2167 and Military Standard 1521B provide a detailed explanation of the proceedings of an FCA.

b. Physical Configuration Audit. The PCA is a formal examination of the as-built version of the configuration item against its documentation in order to establish the Product Baseline (PBL) (Type C specification). The PCA includes a detailed audit of engineering drawings, specifications, technical data, and tests utilized in production of HWCIs, and a detailed audit of design documentation, listings, and manuals for CSCIs. For software, the Software Product Specifications, including the Software Top Level Design Document, Software Detailed Design Document, Interface Design Document, Data Base Design Document, and Version Description Document shall be a part of the PCA review. For software, CG, MCDEC will ensure that MCTSSA or the appropriate designated PDSSA participates in the audit. The PCA shall be conducted on the first production article of new or replacement configuration items. The contractor is responsible for conducting the PCA; contractual requirements are the PDA's responsibility. The APO and CMC (LMA-2) will assure that both the FCA and PCA are completed, as a prerequisite to establishing the PBL, in accordance with MCO 4130.1A. MCO 4130.1A, DoD Standard 2167, and Military Standard 1521B contain additional information about the PCA. Appendix C contains a checklist for PCA interoperability items.

c. Formal Qualification Review. The FQR is the Government's formal certification that the configuration items perform as specified and normally occurs concurrent with the FCA and prior to the PCA. If sufficient test results are not available, such as results of scheduled interoperability testing, the FQR will be conducted post-PCA whenever the necessary tests have been conducted. The APO is responsible for determining completion of FQR in

accordance with MCO 4130.7. The system DPO will assist, as requested. The FQR checklist (Appendix C) can be used as a guide to the interoperability issues reviewed at an FQR. MCO 4130.1A, DoD Standard 2167, and Military Standard 1521B contain additional information about the FQR.

d. The chairman of the FQR will recommend interoperability certification based upon the results of FCA/FQR proceedings to the system sponsor and the DPO. The DPO, upon verification of interoperability achievement based upon test reports and FCA/FQR minutes, provides his recommendation for certification to both the system sponsor and the Development Center (D101). The Development Center (D101) evaluates the test reports and FCA/FQR minutes for interoperability achievement, and forwards a recommendation to the Director, Development Center who, in turn, provides the interoperability certification recommendation for CG, MCDEC to CMC (CC).

4. Certification Decision Process. Figure 6-1 depicts the interoperability certification process and the following subparagraphs explain the figure in detail. Section 4D of table 9-1 outlines certification responsibilities.

a. Provide Certification Data and Recommendations (Blocks 1, 1a, 1b, Through 4, 6, and 7). The ACG provides verification that interoperability requirements have been met in DT/OT and also provides an interoperability certification recommendation to the system sponsor. The system sponsor, after a review of all DT/OT data, and the ACG recommendations, must verify that the interoperability requirements of the system have been attained and, if so, recommend interoperability certification to CMC (CC). If the results of DT/OT indicate that sufficient interoperability has not been achieved, the system sponsor requests MCDEC to correct the noted deficiencies and MCOTEA and/or MCDEC to perform further testing. If DT/OT results are positive, the system sponsor recommends interoperability certification and provides system interface descriptions (format contained in MCO 3093.1B) to CMC (CC). Concurrently, the Development Center (D101) reviews the DT/OT test reports and provides comments and an interoperability certification recommendation to CG, MCDEC (D06) for consideration. CG, MCDEC (D06), provides an interoperability certification recommendation to CMC (CC). CMC (RD) provides an information copy of MCOTEA's IER, including MCOTEA's evaluation of the level of interoperability incorporated, to CMC (CC) for review.

b. The Interoperability Certification Decision (Blocks 5 Through 10a). CMC (CC) makes the interoperability certification decision for all Marine Corps TDSs and interconnecting equipment. CMC (CC), subsequent to receiving interoperability certification recommendations from the system sponsor and CG, MCDEC, and MCOTEA's evaluation of the level of interoperability incorporated, furnishes the recommendations, DT/OT test reports and appropriate comments to the Interoperability Policy Board. The IPB, after review of the interoperability data, provides a certification recommendation and, possibly a recommendation for additional or certification testing to CMC (CC). CMC (CC), upon consideration of inputs from the IPB, system sponsor, CG, MCDEC, and Director, MCOTEA, makes the interoperability certification decision. If a TDS/equipment is certified for interoperability, a certification statement is

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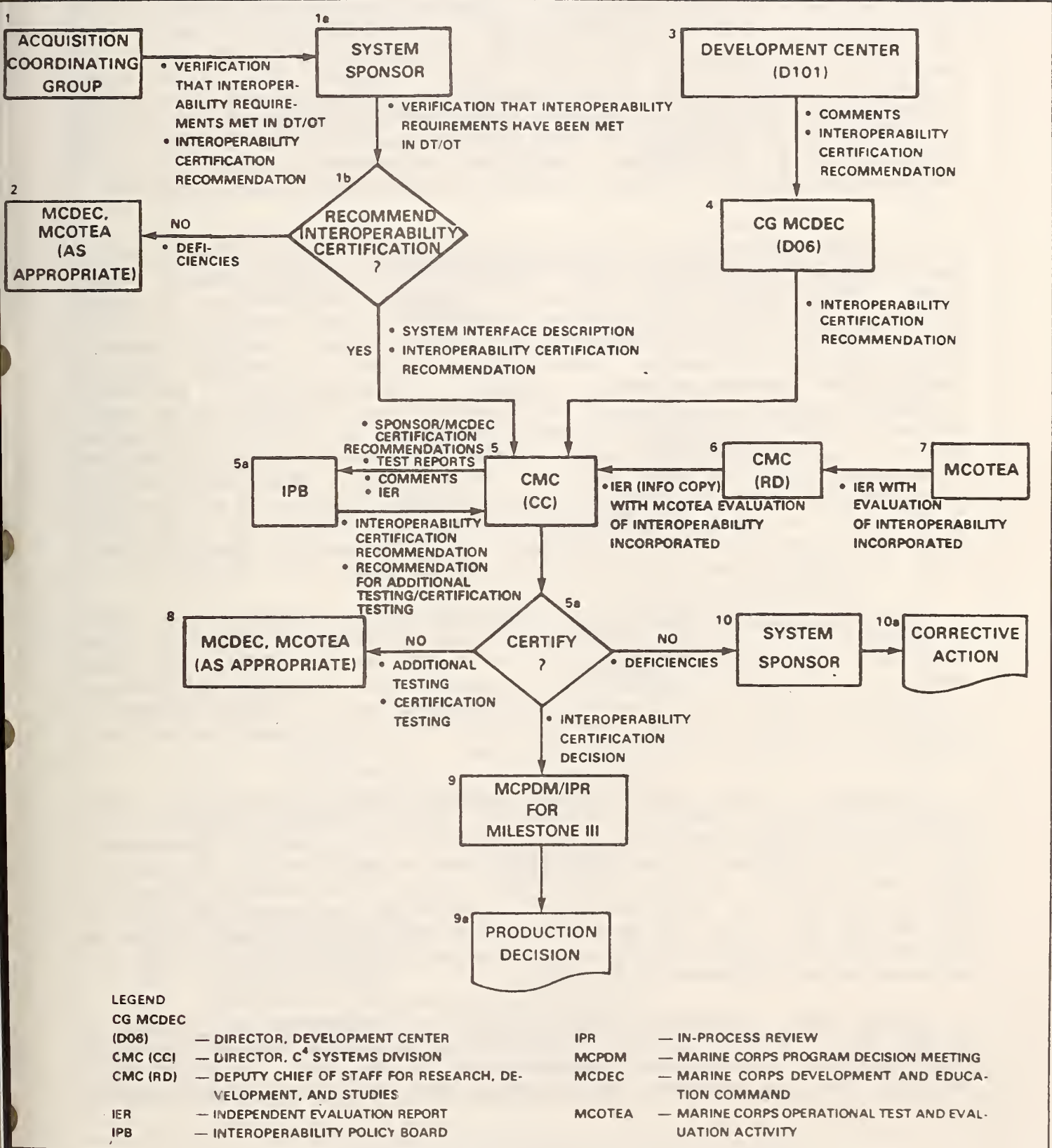


Figure 6-1.--Certification Decision Process.

issued. If certification is not granted, the deficiencies are provided to the system sponsor for corrective action. Additional testing may be required if the preproduction model of the TDS/equipment tested differs significantly from the production model. In that case, CMC (CC) requests MCDEC or MCOTEA, as appropriate, to perform the additional testing. Further, CMC (CC) may elect to subject the TDS/equipment to an independent certification test conducted by MCTSSA and will so notify CG, MCDEC. In any case, the certification decision is provided to the MCPDM/IPR for consideration in a production decision. The MCPDM/IPR could, if necessary, delay any production decision until all additional/certification testing is completed and all deficiencies corrected.

6002. JOINT INTEROPERABILITY CERTIFICATION. JTC^{3A} Circular 9002, provides the procedures for certifying joint/combined technical and procedural interfaces. JTC^{3A} Circular 9002 defines a technical interface as a shared boundary employed in a joint/combined environment, either between a tactical data system and an external communications system, between a tactical communications system and another communications system, or between tactical communication systems equipment. Likewise, it states that a procedural interface consists of the methods and procedures used to establish an interconnection within or between systems/equipment and to transfer information within or between systems/equipment. Marine Corps responsibilities contained in paragraph 6001 also apply to joint certification. Responsibilities for joint/combined interface certification are outlined in section 4D of table 9-1. Certification of TDSs with joint/combined interfaces (figure 6-2) is provided by the JCS based upon the recommendation of JTC^{3A} and the sponsoring service. The following paragraphs expand the details contained in figure 6-2.

1. Direction and Guidance for Joint Interface Testing (Block 1). The JTC^{3A} is responsible for testing procedural interface standards to be used in joint interfaces. Technical interfaces may be tested by the JTC^{3A}, sponsoring service, or CINC test organizations. Planning, test direction, and guidance is provided by JTC^{3A} to all units, organizations, and activities involved in procedural interface testing. The JTC^{3A} will review and comment on all test plans for the testing of technical interfaces.

2. Processing of Joint Interface Test Results (Blocks 2 Through 5a). Data gathered during joint testing is provided to the Joint Interface Test Force and PTUs (for procedural interfaces), or to the RTO (for technical interfaces). Test results authored by the appropriate test organization are provided to JTC^{3A} and CMC (CC). In those cases where Marine Corps organizations are a PTU or the RTO, an interoperability certification recommendation is also provided CMC (CC). CMC (CC) provides comments and copies of test reports to the IPB for evaluation. DT/OT of a technical interface also involves the processes shown in figures 5-4 and 5-5.

3. Marine Corps Interoperability Certification Recommendation (Blocks 5 Through 5c). CMC (CC) has the responsibility to provide the Marine Corps' interoperability certification recommendation to the JCS. In making that decision, CMC (CC) considers the procedural and technical interface reports

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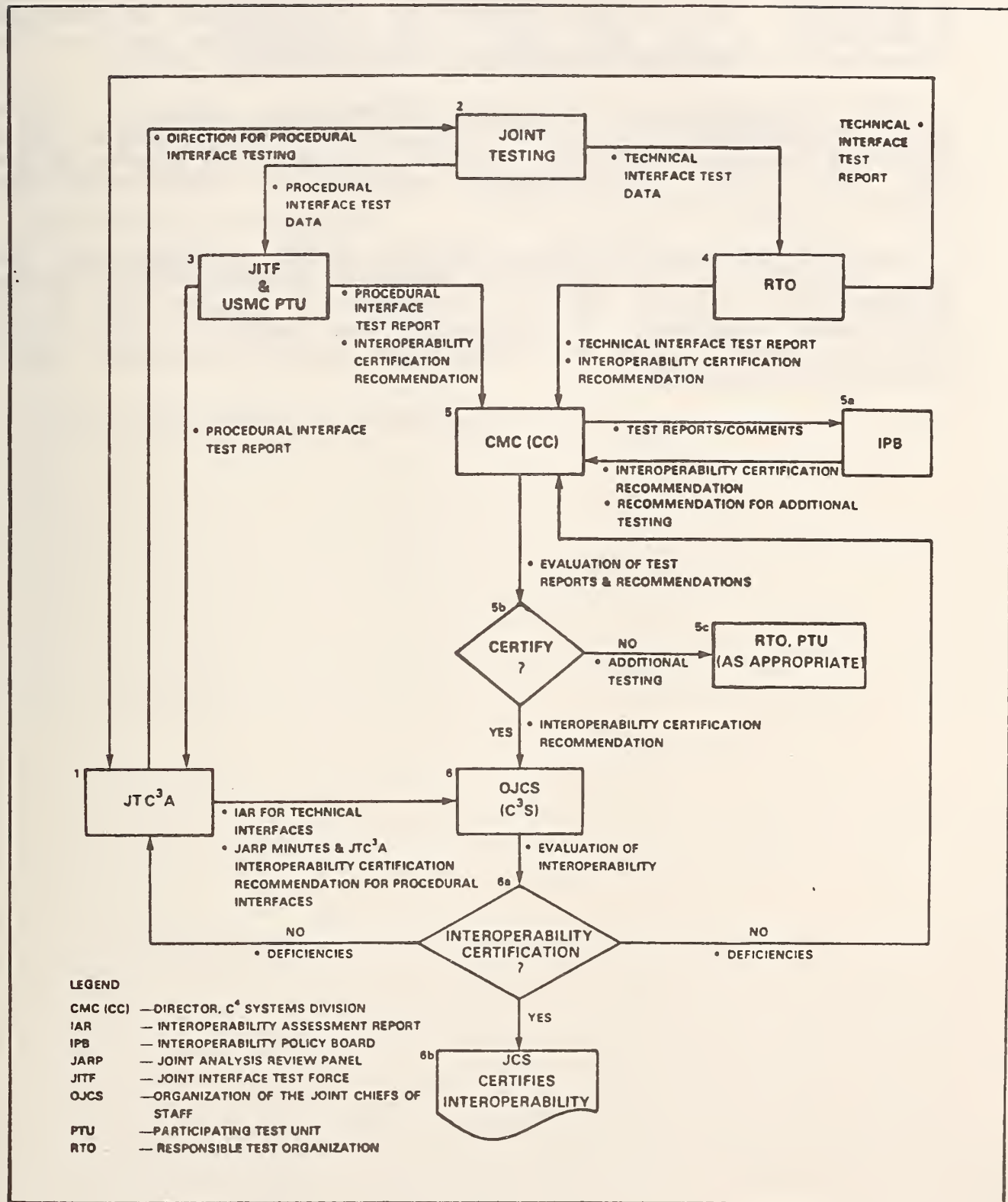


Figure 6-2.—Joint Interface Certification Process.

and the recommendation of the IPB. The IPB, based upon review of test reports, comments, and interoperability certification recommendations, may recommend interoperability certification and/or additional testing to CMC (CC). If additional testing is required, CMC (CC) tasks the Marine Corps RTO or PTU as appropriate. CMC (CC) then provides the interoperability certification recommendation to the OJCS (C³S). The recommendation can be for interoperability certification, against it, or for additional testing.

4. JTC3A Interoperability Certification Recommendation (Block 1). JTC³A reviews the test reports provided by the RTO and JITF/PTUs, provides an Interoperability Assessment Report for technical interfaces and minutes of the JARP, and a JTC³A interoperability certification recommendation for procedural interfaces to the OJCS (C³S).

5. The Joint Interface Certification Decision (Blocks 6 Through 6b). The OJCS, (C³S) based upon the review and evaluation of the JTC³A and service recommendations, certifies TDSS and interconnecting equipment for use on joint/combined interfaces. If deficiencies are noted, the OJCS (C³S) informs the Marine Corps and JTC³A, and delays certification until deficiencies are corrected.

INTEROPERABILITY MANAGEMENT PLAN

CHAPTER 7

INTEROPERABILITY CONFIGURATION MANAGEMENT

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INTEROPERABILITY MANAGEMENT PLAN

CHAPTER 7

INTEROPERABILITY CONFIGURATION MANAGEMENT

7000. GENERAL. Interoperability standards, including message, data and protocol standards, and individual system and equipment interfaces must be managed throughout their life cycles. As technology, doctrine, organizations, weapons and munitions change, the language and information requirements of OPFACs, tasks, and supporting systems will also change. At the same time, tactical data and communications systems wear out and/or become obsolete and must continually be replaced. Thus, the management of change must be continuous. This management process is called configuration management and, within DoD, is guided by the terminology, concepts, and procedures of MIL-STD-483A. Configuration Management applies technical and administrative direction and supervision to identify and document configuration items, including interoperability standards, control changes to those CIs (through Configuration Control), record and report changes to those CIs (Configuration Status Accounting), and examine or verify the item's functional performance and physical configuration identification (through configuration audits). The application of CM on one system is fairly simple; however, among several interfacing systems it becomes extremely complex. The CM process must not only address message, data, protocol, and equipment standards, but multiple interfacing systems and equipment as well. Within the Marine Corps, CM of interconnecting equipment is divided among many different sponsors and ACGs and is separated from the CM of interoperability standards. The fact that a significant number of Marine Corps systems are procured by other services, who are responsible for this CM function, further exacerbates the problem. This chapter reemphasizes established policy and prescribes coordination between various CM bodies and organizations.

7001. INTEROPERABILITY CM STRUCTURE. The structure of Marine Corps CM activities directed towards the management of changes to tactical data system components and interoperability standards is shown in figure 7-1. The components of that structure and their general responsibilities are discussed below.

1. Interoperability Policy Board. The IPB was established by MCO 3093.1B and supports CMC (CC) in developing recommendations on interoperability policy and requirements. Detailed responsibilities for the IPB are contained in the MCICMP. These include making recommendations regarding Marine Corps CM policy and procedures related to the development, documentation, and maintenance of interoperability requirements and standards. The IPB may request either the Interoperability Configuration Control Board (convened by CG, MCDEC (D06)) or an Interoperability Technical Review Group (convened by CMC (CC)) to examine all or part of an action prior to forwarding its recommendation. The IPB may also review and recommend Marine Corps participation in other service and joint/allied CM activities.

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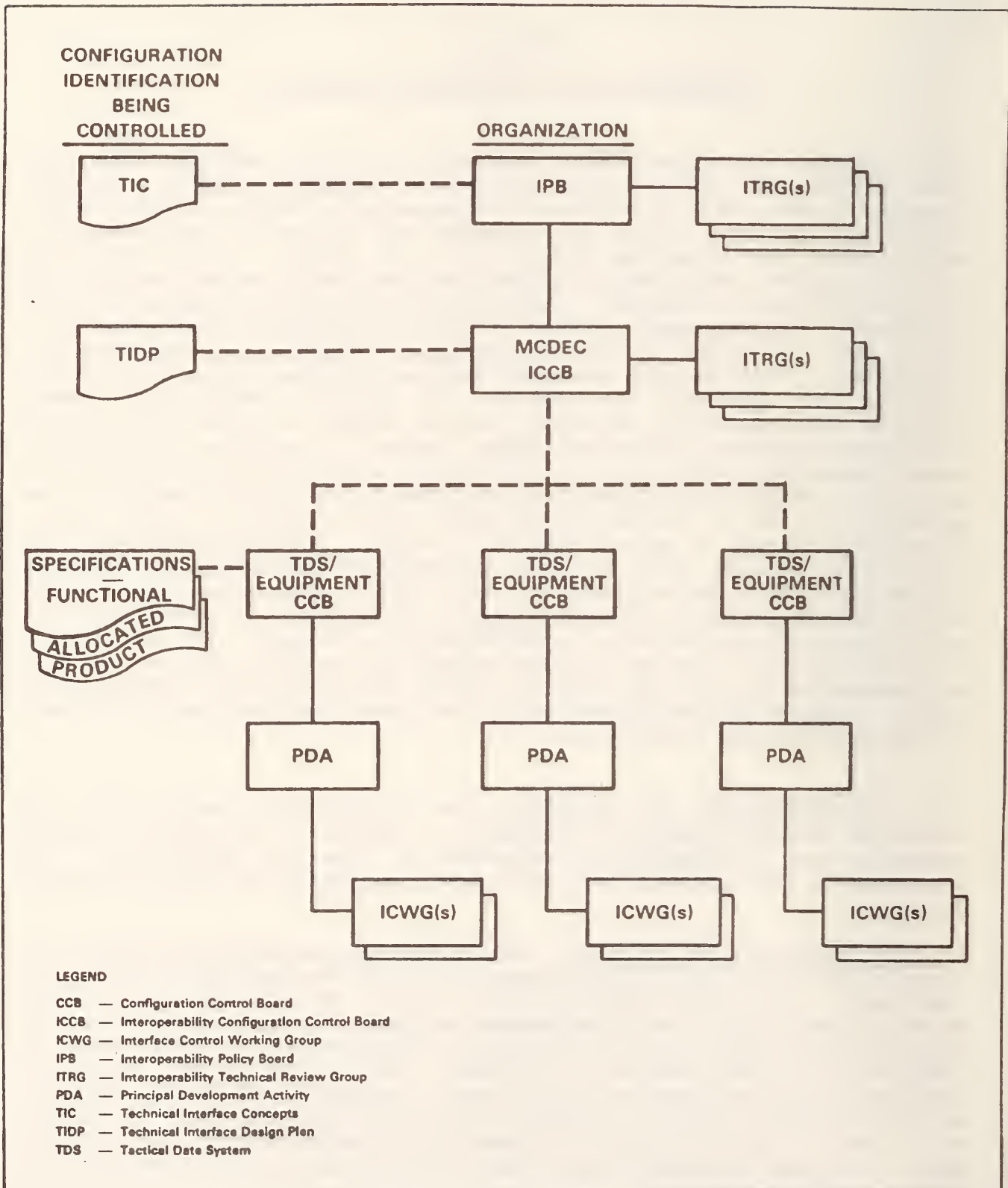


Figure 7-1.--USMC Interoperability CM Structure.

2. Interoperability Configuration Control Board. CG, MCDEC (D06) is responsible for the configuration control of intraoperability standards and Marine Corps participation in joint/allied interoperability standards CM activities in accordance with MCO 3093.1B. The ICCB was established to review proposed changes to those standards and to make recommendations for their approval and implementation. The ICCB may recommend, subject to CG, MCDEC (D06) approval, that Interoperability Technical Review Groups be convened, as required, to complete technical and operational evaluations of proposed intra/interoperability standards and changes thereto. CG, MCDEC (D101) distributes approved changes to Marine Corps intraoperability standards to all baseline holders including PDAs for subsequent implementation.

3. Tactical Data System/Equipment Configuration Control Boards. Individual TDS/equipment CCBs are organized in accordance with MCO 4130.5 and their respective CM plans. They review and recommend Government action on proposed changes to hardware and software FBLs, ABLs, and PBLs throughout the life cycle of the item. The system DPO is a member of these CCBs and is responsible for coordinating proposed changes affecting interoperability with CG, MCDEC (D101) and other interfacing system DPOs and sponsors, as required. CMC (LM) is responsible for coordinating proposed TDS/equipment ECPs with other services, joint, and allied agencies, as appropriate.

4. Interface Control Working Groups. In the acquisition plan, the acquisition program sponsor may require that ICWGs be organized to resolve design problems on specific interfaces. These requirements will be implemented by the PDA in the procurement package. ICWGs may also be subsequently established by PDAs, via contract modification, to coordinate and resolve technical interface problems related to interoperability standards or equipment specifications implementation. Appropriate Marine Corps participation will be directed by the Acquisition Sponsor Project Officer. ICWG organization, procedures, and products will be in accordance with appendix II of MIL-STD-483A.

7002. CM POLICY AND PROCEDURES

1. Initiation of Formal Configuration Management Procedures. In accordance with DoDD 5010.19, MCO 4130.1A, MCO 4130.2, Configuration Management Support of Computer-Aided Tactical Systems (reference (ff)) and MCO 4130.4, formal configuration management procedures will be implemented on all Marine Corps tactical data systems and interconnecting equipment at or after Milestone I. No system will proceed to full scale development (Milestone II) until formal configuration management bodies and procedures are established by an approved Government configuration management plan. CMC (LMA-2) is responsible for the development and execution of the system/equipment CM Plan; the APO will normally prepare the plan. The acquisition program sponsor will approve the plan and ensure its implementation prior to MCPDM II or the corresponding IPR committee meeting.

2. Contractual Imposition. Marine Corps and supporting PDA contracting officers will ensure that approved Marine Corps CM plans are published and

furnished to all prospective system developers and equipment suppliers. Procurement packages prepared for Marine Corps acquisitions will invoke those CM plans and require contractor responsiveness to, and interaction with, government configuration control boards with regard to proposing changes to approved functional, allocated and product baselines and existing message, data and protocol standards. CMC (LMA-2) is responsible for developing and maintaining appropriate data item descriptions to support these procurement package requirements.

3. Marine Corps Tactical Data Systems and Equipment. Configuration control of Marine Corps TDSs and equipment will be managed in accordance with the procedures of MCO 4130.5 and MIL-STD-483A. The DPO is responsible for ensuring that proposed changes affecting mission area interface boundaries are distributed to and reviewed by CG, MCDEC (D101).

4. Marine Corps Interoperability Requirements and Standards. Configuration control of approved Marine Corps interoperability requirements and standards will be in accordance with the procedures of the MCICMP.

5. Other Service Tactical Data Systems/Equipment. Marine Corps participation in the configuration management of TDSs and equipment, which will be procured for Marine Corps use but are managed by other service sponsors, will be in accordance with MCO 4130.1A. Marine Corps representation to the other service will be determined by the acquisition program sponsor, but normally will be the APO or DPO depending on where the specific system/equipment is in the acquisition life cycle. That representative will be responsible for ensuring proposed changes affecting functional interface boundaries are distributed to and reviewed by the ASPO, APO, and DPO for each of the other Marine Corps interfacing systems or equipment.

6. Other Service Interoperability Standards. Marine Corps participation in the configuration control of other service standards employed in Marine Corps systems will be in accordance with procedures of appendix N to the MCICMP.

7. Joint Service Interoperability Standards. Marine Corps participation in the configuration control of joint standards embodied in JCS Publications 10, 12, or 25, the Interface Design Handbook and related TIDPs will be as prescribed in reference (f) and the MCICMP.

8. Allied Standards. Marine Corps participation in the configuration control of allied equipment standards will be in accordance with MCO 5711.1E, U.S. Marine Corps Procedures for Participation in the International Standardization Process (reference (gg)). Participation in the configuration control of allied message, data, and protocol standards will be in accordance with appendix M of the MCICMP.

INTEROPERABILITY MANAGEMENT PLAN

CHAPTER 8

PROGRAM COST PLANNING AND BUDGETING

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INTEROPERABILITY MANAGEMENT PLAN

CHAPTER 8

PROGRAM COST PLANNING AND BUDGETING

8000. INTRODUCTION. The purpose of this chapter is to define funding responsibilities for Marine Corps-wide interoperability programs, and for funding interoperability requirements in individual systems. MCO P5000.10 provides guidance for estimating system development costs and for determining system life-cycle costs. This guidance applies to estimating and including the cost of implementing interoperability standards during the system acquisition process, and for life-cycle management of the system to the end of its useful life.

8001. INTEROPERABILITY PROGRAM COST PLANNING AND BUDGETING. As the Marine Corps manager of tactical data systems interoperability, the Director, C⁴ Systems Division (CMC (CC)) is responsible for funding of Marine Corps-wide interoperability programs and requirements that are not related to any specific system and for funding programs that establish Marine Corps interoperability standards. These programs currently include TACSIIP, JINTACCS, MCICS, and TADIL J. They also include funding for required Marine Corps participation in any meetings or programs related to the development of other joint or NATO interoperability standards. CMC (CC) is further responsible for funding hardware and software that is planned for use in testing and certifying interoperability.

8002. SYSTEM-RELATED INTEROPERABILITY STANDARDS IMPLEMENTATION PROGRAM COST PLANNING AND BUDGETING. Funding to satisfy interoperability requirements and implement interoperability standards in individual systems or funding intraoperability among similar functional systems is the responsibility of the acquisition program sponsor. Responsibility for funding to satisfy interoperability requirements for TDSs and interconnecting equipment representing two or more mission areas will be referred to the IPB for resolution in accordance with MCO 3093.1B and the MCICMP. The acquisition program sponsor is also responsible to ensure funding is included to support interoperability testing and certification requirements under the cognizance of JTC³A. Upon completion of the system development process, funding for support of operational systems, to include modification to standards, testing, and certification under Marine Corps or joint procedures, is the responsibility of the CMC (L).

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CHAPTER 9

RESPONSIBILITIES

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INTEROPERABILITY MANAGEMENT PLAN

CHAPTER 9

RESPONSIBILITIES

9000. INTRODUCTION. Responsibilities for interoperability within the Marine Corps cross several echelons of command and numerous mission areas; normally involve other service organizations, and if a system is a candidate for use among services in joint/combined operations, involves interoperability organizations chartered by DoD. As previously stated, MCO 3093.1B assigns CMC (CC) the primary responsibility for establishing, promulgating and enforcing interoperability requirements for Marine Corps TDSs and interconnecting equipment. System acquisition sponsors have a significant interoperability responsibility to ensure that TDSs/equipment within their mission areas are designed in compliance with Marine Corps interoperability policy. CMC (L) ensures that interoperability efforts are consistent with integrated logistics support and configuration management policies during the acquisition cycle and has cognizance over product improvement programs that affect the interoperability of fielded systems. CMC (RD) also plays an important role in carrying out interoperability policies by ensuring that documents related to development and acquisition of TDSs and interconnecting equipment fully consider critical interoperability issues.

9001. MARINE CORPS INTEROPERABILITY RESPONSIBILITIES. The responsibilities of all organizations involved in ensuring interoperability discussed in preceding chapters are summarized in table 9-1 and are organized by primary interoperability management activities. They include the following:

1. Interoperability Policy and Planning. This activity outlines the responsibilities within the Marine Corps for establishing interoperability policy and development of orders and management plans for carrying out that policy.
2. Definition of Requirements and Standards. This section of table 9-1 defines responsibilities for developing interoperability requirements, designing standards to satisfy those requirements, and for documenting requirements and standards.
3. Implementation and Verification of Requirements and Standards. This section of the table defines responsibilities for ensuring interoperability standards are specified during the development, design, acquisition, production, and operational phases of a TDS/equipment's life cycle. It also outlines those responsibilities that ensure, through contractual and formal review-verification procedures, that the correct standards were specified.
4. Testing and Certification. This section outlines responsibilities for formal Marine Corps and joint testing programs that ensure TDSs/equipment meet the interoperability standards specified and, upon completion of successful

testing, that TDSs/equipment are certified for use on Marine Corps and joint/combined interfaces.

5. Configuration Management. This section describes configuration management and control responsibilities that ensure interoperability remains intact as TDSs/equipment and interoperability requirements and standards are modified during their life cycle.

6. Program Budgeting and Planning. This section shows the division of responsibilities between CMC (CC), who funds for overall interoperability programs, and system sponsors, who fund for interoperability requirements in systems under their sponsorship.

INTEROPERABILITY MANAGEMENT PLAN

Table 9-1.—Marine Corps Interoperability Responsibilities.

	DoD	CMC						CG, MCDEC		
		JTC3A	DC/S I&L	DC/S RD&S	DIR C4	MISSION AREA/ ACQUISITION SPONSOR	DIR MCOTEA	FMP	SYSTEM DPO	DIR DEVCTR
1. <u>INTEROPERABILITY POLICY AND PLANNING</u>										
- Establish and publish interoperability requirements and policy (MCO 3093.1B para. 7d(1) and 7d(2))					X					
- Establish and chair Interoperability Policy Board (IPB) (MCO 3093.1B para. 7d(9))					X					
- Resolve interface issues among acquisition sponsors (MCO 3093.1B para. 7d(7))					X					
- Establish guidance for participation in joint and allied interoperability efforts (MCO 3093.1B para. 7d(4))					X					
- Provide Marine Corps representation in joint interoperability standardization programs and organization boards/committees at policy level (MCO 3093.1B para. 7d(8))					X					
- Represent Marine Corps as member of DoD C3 Review Council (MCO 3093.1B para. 7d(8) and DoD DIR 4630.5 para. 6i)					X					
- Provide Marine Corps representation to JCS-sponsored Tactical C3I Interoperability Improvement Program Screening Board and General/Flag Officer Prioritization Board (JCS MOP 160, Appendix C)					X					
- Maintain and update MCO 3093.1B (MCO 3093.1B para. 7d(2))					X					X (D101)
- Maintain and update Interoperability Management Plan (IMP) (MCO 3093.1B para. 7d(2))					X					X (D101)
- Maintain and update the Marine Corps C ² MP										
- Ensure interoperability and compatibility are considered in systems/equipment military effectiveness analyses and related programs (MCO 3093.1B para. 7a(6) and (7))						X				

INTEROPERABILITY MANAGEMENT PLAN

Table 9-1. --Marine Corps Interoperability Responsibilities--Continued.

	DoD	CMC							CG, MCDEC DIR DEVCTR	PDA		
		JTC3A	DC/S I&L	DC/S RD&S	DIR C4	MISSION AREA/ ACQUISITION SPONSOR	DIR MCOTEA	FMP			SYSTEM DPO	CO MCTSSA
- Provide copy of each requirement involving development, acquisition, or modification of tactical C3I systems/equipment having potential joint/combined use or joint/combined interoperability requirements to other DoD components for review (DoD DIR 4630.5 para. 6a and MCO 3093.1B para. 7e(9))									X (D083)			
- Provide copy of each approved requirement involving development, acquisition, or modification of TDSS or equipment, whether Marine Corps unique or not, to the JTC3A upon Marine Corps approval of program initiation (Milestone 0) (DoD DIR 4630.5 para. 6b and MCO 3093.1B para. 7c(2))			X									
- Staff for development review, requirements from other DoD components for USMC interest, interoperability impact, and potential program consolidation (DoD DIR 4630.5 para. 6c and MCO 3093.1B para. 7e(10))					X				X (D083)			
- Act as point of contact for all actions required by DoD DIR 4630.5 (DoD DIR 4630.5 para. 6j and MCO 3093.1B para. 7d(11))												
- Determine if TDS/equipment is a candidate for JCS certification for use on joint/combined interfaces (DoD DIR 5154.28 para 5a and MCO 3093.1B para. 7d(4))	X							X				
- Be sensitive to the impact of sponsored systems and equipment designs on other interfacing systems and equipment, and ensure that the operationally-required levels of interoperability and intraoperability are maintained (MCO 3093.1B para. 7a(3))								X				
2. DEFINITION OF REQUIREMENTS AND STANDARDS												
- Conduct Mission Area Analyses (MAA) and define the operational requirements that serve as the basis for the interoperability requirements contained in the TIC (MCO P5000.10__)								X				
- Ensure other service and allied capabilities are properly and thoroughly considered before new developmental efforts are begun (MCO 3093.1B para. 7a(9))								X				

INTEROPERABILITY MANAGEMENT PLAN

Table 9-1.--Marine Corps Interoperability Responsibilities--Continued.

	DoD	CMC						CG, MCDF/C			
		JTCC3A	DC/S I&L	DC/S RD&S	DIR C4	MISSION AREA/ ACQUISITION SPONSOR	DIR MCOTEA	FMM	SYSTEM DPO	(U) MTSSA	PJA
<ul style="list-style-type: none">- Ensure all requirements for new types of TDSS and equipment that are part of a weapons system receive at least the same consideration for interoperability and compatibility aspects as the requirements for separate TDSS developments (MCO 3093.1B para. 7a(5))- Ensure documents relating to unique Marine Corps validated requirements contain a statement, with justification, that there are no known existing, planned, or potential joint or combined uses for those requirements (MCO 3093.1B para. 7d(14))- Ensure that program TDS and equipment requirements documents are promulgated in accordance with MCO P5000.10A, and MCO 3909.4C (MCO 3093.1B para. 7c(1))- Ensure that TDS and equipment requirements documents staffed are in agreement with the TIC (MCO 3093.1B para. 7d(13))- Recommend interoperability requirements pertaining to mission area to Director C4 (MCO 3093.1B para. 5)- Establish interoperability requirements and publish requirements in the TIC (MCO 3093.1B para. 5 and para. 7d(1))- Recommend to Director C4 additions and changes to the TIC (MCO 3093.1B para. 5)- Develop and publish intraoperability standards in the TIDP (MCO 3093.1B para. 7e(1))- Recommend additions and changes to intraoperability standards in the TIDP (MCO 3093.1B para. 5)- Participate at policy level with other services and joint/allied agencies in development of interoperability requirements and standards (MCO 3093.1B para. 7d(8))	JTCC3A			X		X					
					X						
				X							
					X						
						X				X (DIOI)	
										X (DIOI)	

INTEROPERABILITY MANAGEMENT PLAN

Table 9-1.--Marine Corps Interoperability Responsibilities--Continued.

	DoD	CWC						CG, MCDEC		PDA	
		JTC3A	DC/S I&L	DC/S RD&S	DIR C4	MISSION AREA/ ACQUISITION SPONSOR	DIR MCOTEA	FNF	DIR DEVCTR		
									SYSTEM DPO		CU MCTSSA
<ul style="list-style-type: none">- Provide Marine Corps representation on joint, allied, and other interoperability standards working level boards and groups (MCO 3093.1B para. 7e(4) and 7e(7))- Notify CG, MCDEC (D101) of changes to tactical communications system technical standards under the Defense Standards and Specifications Program affecting Marine Corps TDS/equipment interoperability (MCO 4120.5D para. 5b(2)(b))- Develop, implement, and manage the Marine Corps Interoperability Standard Data Base (ISDB) and the Interoperability Data Base (IDB)		X (LMA-1)						X (D101)	X		
<p><u>3. IMPLEMENTATION AND VERIFICATION OF REQUIREMENTS AND STANDARDS</u></p> <ul style="list-style-type: none">- Ensure Interoperability requirements of the TIC are included in ROCs or if new operational concepts require, recommend changes to the TIC (MCO 3900.4C para. 6c(2) and MCO 3093.1B para. 5a, 7d(13) and 7e(6))- Verify that ROC had adequately addressed interoperability requirements contained in the TIC (MCO 3093.1B para. 7e(6))- Verify that existing interoperability standards will satisfy the ROC- Review and update interoperability requirements contained in ROC annually (MCO 3900.4C para. 6c)- Determine which audits/reviews will be required for the acquisition program- Ensure inclusion of interoperability requirements in Acquisition Plan (AP) (MCO P5000.10__)- Ensure appropriate interoperability standards are provided to System DPO			X	X				X (D101)	X (D101)		

Table 9-1.--Marine Corps Interoperability Responsibilities--Continued.

	DoD	CMC						CG, MCDEC	
		JTC3A	DC/S I&L	DC/S RD&S C4	MISSION AREA/ ACQUISITION SPONSOR	DIR MCOTEA	FNF	DIR DEVCTR	
								SYSTEM DPO	CO MCTSSA
- Ensure appropriate interoperability standards are provided to PDA (MCO P5000.10)							X		PDA
- Specify interoperability requirements stated in the ROC and applicable interoperability standards in functional (Type A) specifications							X		
- Ensure the TDS/equipment fits the communications architecture described by the C ² MP. If not, forward the proposed change to CG, MCDEC (D101)									X
- Review system functional (Type A) specifications to ensure appropriate interoperability requirements and standards are correctly specified					X (ASPO)		X		
- Ensure Interoperability problems raised during development of the Type A Spec are forwarded to Acquisition Sponsor for resolution									X
- Request waiver from Dir, C4 for interoperability standards, if required (MCO 3093.1B para. 5c, MCICMP para. 2.4.2)					X				
- Provide an inter/intraoperability Logistics Element Manager (LEM) to the Integrated Logistics Support Management Team (ILSMT)				X					
- Convene Configuration Control Board (CCB) consisting of APO as chairman and ASPO and DPO to prepare a system configuration management plan to be included with procurement package (MCO P5000.10)		X (APO)							
- Ensure each requirement involving TDSS or equipment addresses the requirements, during the expected operational life cycle of those systems or equipment, for compatibility and interoperability with joint, allied, COMSEC, and Defense Communication System (DCS) or other nontactical C3I systems and equipment (MCO 3093.1B para. 7a(4))					X				

INTEROPERABILITY MANAGEMENT PLAN

Table 9-1.—Marine Corps Interoperability Responsibilities—Continued.

	DoD	CMC						PMF	CG, MCDEC DIR DEVCTR		
		DC/S I&L	DC/S RD&S	DIR C4	MISSION AREA/ ACQUISITION SPONSOR	DIR MCOTE A	SYSTEM DPO		CO MCTSSA	PDA	
- Assist PDA in preparation of procurement data package and ensure interoperability-related data items are included	JTC3A	X (APO)			X (ASPO)		X				X
- Ensure technical proposals are adequately evaluated for interoperability requirements		X (APO)			X (ASPO)						
- Prepare development (Type B) specifications to include interoperability standards											X
- Review development (Type B) specifications to ensure interoperability requirements and standards are specified											
- Verify that protocols, message formats, and data elements contained in specifications are in accordance with standards contained in the TIDP (or in accordance with joint standards in the case of joint interfaces)	X (for joint interfaces)	X (APO)	X (DC)		X (ASPO)					X	
- Participate in technical reviews of SSR, SDR, CSC, PDR, CDR, TRR and ensure specified interoperability standards are planned or incorporated											X
- Ensure that design of TDSs and equipment is in compliance with interoperability policy (MCO 3093.1B para. 7a(1))											
- Ensure that interoperability efforts during acquisition cycle are in accordance with ILS and CM policies (MCO 3093.1B para. 7b(1))		X (APO)									
- Ensure approved interoperability requirements are implemented in TDSs under development unless waived (MCO 3093.1B para. 7e(5))										X	
- Approve waivers of the provisions of TIDP for development TDSs (MCO 3093.1B para. 7a(6))				X							
- Ensure that standard interoperability related data item descriptions are provided to PDAs for use by contractors		X (APO)			X (ASPO)						

INTEROPERABILITY MANAGEMENT PLAN

Table 9-1.--Marine Corps Interoperability Responsibilities--Continued.

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INTEROPERABILITY MANAGEMENT PLAN

Table 9-1.--Marine Corps Interoperability Responsibilities--Continued.

	DoD	CMC						FMF	CG, MCDEC			
		DC/S				MISSION AREA/ ACQUISITION SPONSOR	DIR MCOTEA		SYSTEM DPO	CO MCTSSA	PDA	
		JTC3A	I&L	RD&S	DIR C4							
of Test and Evaluation Master Plans (TEMPS) for ACAT I, ACAT IIS, ACAT IIC and those ACAT III programs that MCOTEA is designated to test (MCO 5000.11A para. 6, 7, & 12 and MCO 3093.1B para. 7f(1))												
- Ensure that interoperability requirements are included in all DT documents. Ensure that interoperability requirements are included in Part IV of Test and Evaluation Master Plans (TEMPS) for those ACAT III Programs not designated for MCOTEA OT (MCO 5000.11A para. 6, 7, & 12)										X		
- Maintain Marine Corps interoperability test system and plan for interoperability testing as required (MCO 5000.11A para. 7c)												X
- Ensure interoperability testing using the MTS interoperability test system at MCTSSA is planned for and scheduled as an integral part of DT and OT						X				X		
- Request USMC FYIAP requirements and/or concurrence from CG MCDEC						X					X (D101)	
- Request USMC FYIAP requirements and concurrence from DPOs and MCTSSA											X (D101)	
- Request FYIAP review and concurrence from MCOTEA										X		X
- Provide comments/concurrence of FYIAP to CG, MCDEC											X (D101)	
- Provide USMC FYIAP requirements and/or concurrence to CMC(CC)												
- Convene an IPB as necessary to resolve FYIAP related issues (MCO 3093.1B para. 7d(7) and 7d(9))						X						

INTEROPERABILITY MANAGEMENT PLAN

Table 9-1.--Marine Corps Interoperability Responsibilities--Continued.

	DoD	CMC						FMF	CG, MCDEC		PDA
		DC/S I&L	DC/S RD&S	DIR C4	MISSION AREA/ ACQUISITION SPONSOR	DIR MCOTEA	SYSTEM DPO		DIR DEVCTR	CO MCTSSA	
- Provide USMC FYIAP requirements and concurrence to JTC3A (JTC3A Circ 9002, para. 5-7c3; MCO 3093.1B, para. 7d(11))	JTC3A			X							
- Represent USMC on FYIAP Planning Group (JTC3A Circ 9002, para. 5-5a1, para. 5-7c2; MCO 3093.1B, para. 7d(8))				X						X (D101)	X
- Represent USMC on FYIAP Working Group (JTC3A Circ 9002, para. 5-5b, c; para. 5-7c4; MCO 3039.1B, para. 7e(11))											
B. Conduct of Tests											
- Ensure DT&E is conducted as mutually agreed upon by CG, MCDEC and PDA to demonstrate compatibility and interoperability with existing or planned systems (MCO 5000.11A para. 7c)	X	(witnesses test for joint interfaces)						X			X
- Ensure interoperability testing is conducted as part of DT&E								X			X
- Provide resources, as necessary and appropriate, to support joint and combined TDS and equipment interoperability testing (MCO 3093.1B para. 7e(12))								X		X	X
- Ensure DT&E is conducted during demonstration and validation phase following milestone I to ensure compatibility and interoperability with existing or planned systems to the extent practical (MCO 5000.11A para. 6b)	X	(witnesses test for joint interfaces)						X			X
- Ensure DT&E is conducted after milestone II and prior to production and deployment to ensure that all significant design problems affecting compatibility and interoperability have been identified and that proposed solutions are feasible (MCO 5000.11A para. 6b)	X	(witnesses test for joint interfaces)						X			X
- Ensure PAT&E and DT&E (if required) is conducted after milestone III to assure interoperability technical and engineering requirements have been satisfied including correction of previously identified deficiencies (MCO 5000.11A para. 6b)	X	(witnesses test for joint interfaces)						X			X

INTEROPERABILITY MANAGEMENT PLAN

Table 9-1.--Marine Corps Interoperability Responsibilities--Continued.

	DoD	CMC					FMF	CG, MCDEC			PDA
		DC/S I&L	DC/S RD&S	DIR C4	MISSION AREA/ ACQUISITION SPONSOR	DIR MCOTEA		SYSTEM DPO	DIR DEVCTR	CO MCTSSA	
<ul style="list-style-type: none"> - Participate in interoperability testing (certification, requalification, revalidation testing) as required (MCO 5000.11A para. 7c and JTC3A CIRC 9002) - Ensure that testing is conducted during OT&E to support the evaluation of interoperability requirements contained in the ROC and the Concept of Employment for ACAT I, ACAT IIC, ACAT IIS, and designated ACAT III programs (MCO 5000.11A para. 7b) - Ensure that testing is conducted during OT&E to support the evaluation of interoperability requirements contained in the ROC and the Concept of Employment for ACAT III programs that are not designated to be tested by MCOTEA (MCO 5000.11A para. 7b) - Participate in OT&E as required (MCO 5000.11A para. 7e) - Provide resources to support Marine Corps, joint and combined TDS and equipment interoperability testing (MCO 3093.1B para. 7g) 	X					X				X	
	(witnesses test for joint interfaces)										
<p>C. <u>Test Reporting</u></p> <ul style="list-style-type: none"> - Report results of interoperability testing after DT I, II, and III (including first article and PAT&E) to System DPO - Provide results of interoperability testing after DT I, II, and III (including first article and PAT&E) to Dir, C4 - Report results of interoperability testing after DT I, II, and III (including first article and PAT&E) to acquisition sponsor and Dir, DevCtr (D101) - Report OT results to DC/S RD&S, Dir, MCOTEA, and System DPO - Provide DT/OT test results to ACG members 			X							X	X
					X (ASPO)						

INTEROPERABILITY MANAGEMENT PLAN

Table 9-1. Marine Corps Interoperability Responsibilities—Continued.

	DoD	CMC					CG, MCDEC		
		DC/S I&L	DC/S RD&S	DIR C4	MISSION AREA/ ACQUISITION SPONSOR	DIR MCOTEA	FMP	DIR DEVCTR	
								SYSTEM DPO	CO MCTSSA
	JTC3A					X			PDA
<p>D. <u>Certification</u></p> <ul style="list-style-type: none"> - Evaluate the test data collected in OT&E. Include the interoperability evaluation results in the Independent Evaluation Report (IER) to DC/S RD&S (MCO 3093.1B para. 7f(2) and 7f(3)) - Provide OT&E results and information copy of IER including MCOTEA's evaluation of interoperability incorporated to DIR, C4 - Report results of observed DT/OT and make recommendations to JCS for interoperability certification of TDSs having joint/combined interfaces (JTC3A CIRC 9002 para. 3-4C, and 4-4B.2) 	X		X						
		X (APO)	X (DC)		X (ASPO)			X	X (or other PDSSA)
		X (APO)							X (or other PDSSA)
		X (APO)	X (DC)		X (ASPO)			X	X (or other PDSSA)
									X
								X (D101)	
								X (D06)	

INTEROPERABILITY MANAGEMENT PLAN

Table 9-1.--Marine Corps Interoperability Responsibilities--Continued.

	DoD	CMC					PMF	CG, MCDEC		PDA
		DC/S I&L	DC/S RD&S	DIR C4	MISSION AREA/ ACQUISITION SPONSOR	DIR MCOTEA		DIR DEVCTR		
								SYSTEM DPO	CO MCTSSA	
<ul style="list-style-type: none">- Verify that TIC requirements and appropriate interoperability standards have been implemented and provide recommendation for interoperability certification to Dir, C4 (MCO 3093.1B para. 7a(1))- Request CG, MCDEC (DO6) to conduct an independent certification test if DT&E/OT&E do not support an interoperability certification decision- Certify interoperability of Marine Corps TDSs and inter-connecting equipment (MCO 3093.1B para. 7d(5))- Provide interoperability certification decision to the MCPDM/IPR (MCO 3093.1B para. 7d(5))- Provide recommendation to JCS for certification of TDSs/equipment having joint/combined interfaces (JTC3A CIRC 9002 para. 4-4B.2)- Obtain certification of interfaces before new or modified TDSs are employed in joint, combined, or Marine Corps operations (MCO 3093.1B para. 7a(10))					X					
	X			X						
					X					
E. Retest/Requalification										
<ul style="list-style-type: none">- Plan retesting in event interoperability deficiencies are noted in original testing (JTC3A CIRC 9002 para. 4-4B2.b and MCO 5000.11A para. 7c)- Plan requalification testing for tactical data system software and equipment- Ensure requalification testing resulting from modifications, enhancements, or system software changes is conducted (JTC3A CIRC 9002 para. 4-4B.2.b)- Report results of requalification testing to acquisition sponsor and Dir, C4, DC/S I&L (LM), and CG, MCDEC (D101)	X (for joint interfaces)	X (LM)						X		X
	X	X (LM)							X	

INTEROPERABILITY MANAGEMENT PLAN

Table 9-1.--Marine Corps Interoperability Responsibilities--Continued.

	DoD	CMC						CG, MCDEC			PDA
		JTC3A	DC/S IS&L	DC/S RD&S	DIR C4	MISSION AREA/ ACQUISITION SPONSOR	DIR MCOTEA	FMP	DIR DEVCTR		
									SYSTEM DPO	CO MCTSSA	
<ul style="list-style-type: none">- Evaluate results of requalification and provide comments/recommendations for interoperability recertification to Dir, C4 (MCO 4130.2 para. 7c)- Recertify TDS/equipment (MCO 4130.2 para. 8a)- Provide recommendation to JCS for joint interoperability recertification (JTC3A CIRC 9002 para. 3.2.c)- Determine requirement for Marine Corps revalidation testing				X	X	X			X (D101)		
5. CONFIGURATION MANAGEMENT											
- Establish Marine Corps policy and procedures for CM of interoperability requirements and standards (MCO 3093.1B para. 7d(3))					X						
- Provide guidance on Marine Corps participation in other service, joint, and allied CM activities related to CM of interoperability standards (MCO 3093.1B para. 7d(4))					X						
- Provide Marine Corps representation on other service and joint policy level CM boards and committees (MCO 3093.1B para. 7d(8))					X						
- Perform Configuration Management of Marine Corps configuration items including requirements (USMC TIC) and standards (TIDP) (MCO 3093.1B para. 7d(1))					X						
- Propose changes to interoperability requirements (TIC) resulting from the review of Marine Corps and other Service ROCs and Joint Service Operational Requirements (JSORs)					X	X					
- Perform configuration control of Marine Corps intraoperability standards (TIDP) (MCO 3093.1B para. 7e(2))										X (D06)	
- Establish and conduct ICCB meetings to review, assess and recommend (1) proposed changes to Marine Corps intraoperability standards and (2) Marine Corps technical and operational positions regarding proposed changes to other service, joint, and allied interoperability standards (MCO 3093.1B para. 7e(3))										X (D06)	

INTEROPERABILITY MANAGEMENT PLAN

Table 9-1.--Marine Corps Interoperability Responsibilities--Continued.

	DoD	CMC					FMF	CG, MCDEC		PDA
		DC/S I&L	DC/S RD&S	DIR C4	MISSION AREA/ ACQUISITION SPONSOR	DIR MCOTEA		SYSTEM DPO	DIR DEVCTR	
	JTC3A			X						
<ul style="list-style-type: none"> - Convene Interoperability Technical Review Groups (ITRGs) to resolve and recommend solutions to Marine Corps interoperability or interface problems (MCICMP 3.4.6 and Appendix E) - Publish and disseminate approved changes and revisions to USMC interoperability configuration items (MCICMP 2.2.3 and 3.4.11) - Perform status accounting of all USMC interoperability configuration item changes (MCICMP 3.5.2) - Provide USMC representation to other service, joint, and allied interoperability standards working level CM boards and committees (MCO 3093.1B para. 7e(4)) - Develop government CM plan for each program associated with TDS/equipment acquisition, procurement, or reprourement (MCO 4130.3 para. 6a) - Place TDSs and their specifications under approved configuration management (MCO 3093.10 para. 7a(3)) - Establish and conduct individual TDS/equipment program Configuration Control Boards (CCBs) - Participate in TDS/equipment program CCBs 										
		X (LM)								
					X					
		X (LM)			X (ASPO)			X		X
					X (ASPO)			X		
<ul style="list-style-type: none"> - Coordinate proposed ECPs affecting TDS/equipment interoperability with other interfacing system sponsors/DPOs and CG, MCDEC (D101) - Coordinate proposed ECPs affecting TDS/equipment interoperability with other services, joint, and allied agencies (DoDD 4630.5 para. 6h) - Ensure interoperability standards are reflected in TDS/equipment modifications 		X (LM)		X						
		X								

INTEROPERABILITY MANAGEMENT PLAN

Table 9-1.--Marine Corps Interoperability Responsibilities--Continued.

	DoD	CMC						PMF	CG, MCDEC	
		DC/S I&L	DC/S RD&S	DIR C4	MISSION AREA/ ACQUISITION SPONSOR	DIR MCOTEA	DIR DEVCTR			
							SYSTEM DPO		CO MCTSSA	
- Ensure contractor system and interoperability CM requirements are integrated into procurement data packages and contracts in accordance with sponsor's Acquisition Plan or I&L requirements	JTC3A	X (LB)								PDA X
- Establish and conduct Interface Control Working Groups (ICWGs) to resolve technical interface issues		X (LM)								X
- Provide USMC representation on other service TDS/equipment CM boards and committees		X (APO)						X (as tasked)		
- Participate in Functional and Physical Configuration Audits (FCAs/PCAs) for TDSs and equipment (MCO 4130.7 para. 7c)		X (APO)	X (DC)		X (ASPO)			X	X (as tasked)	X
6. <u>PROGRAM BUDGETING AND PLANNING</u>										
- Fund Marine Corps interoperability programs, not related to specific systems or mission areas, that establish interoperability requirements and standards (MCO 3093.1B para. 6c)			X							
- Fund Marine Corps participation in meetings and/or programs related to development of joint/allied interoperability standards (MCO 3093.1B para. 6c)			X							
- Fund activities to satisfy system interoperability requirements (MCO 3093.1B para. 6c)					X					
- Fund activities to satisfy interoperability requirements not directly related to a single system (MCO 3093.1B para. 6c)			X							
- Fund hardware and software for interoperability test and certification not related to a specific system or mission area (MCO 3093.1B para. 6c)			X							
- Fund system-unique hardware and software for interoperability testing and certification (MCO 3093.1B para. 6c)					X					
- Fund system-unique USMC and joint interoperability testing and certification requirements (MCO 3093.1B para. 6c)						X				

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Table 9-1.--Marine Corps Interoperability Responsibilities--Continued.

	DoD	CMC						FMF	CG, MCDEC		PDA
		JTC3A	DC/S I&L	DC/S RD&S	DIR C4	MISSION AREA/ ACQUISITION SPONSOR	DIR MCOTEA		DIR DEVCTR		
									SYSTEM DPO	CO MCTSSA	
- Fund modifications to, and testing of, fielded systems/equipments resulting from approved ICPs/ECPs (MCO 3093.1B para 5d)											
- Refer funding issues to IPB for resolution (MCO 3093.1B para. 7a(7))		X			X						
- Ensure interoperability and compatibility are considered in all systems/equipment cost analyses and budget requests (MCO 3093.1B, para. 7a(7))						X					
- Ensure interoperability and compatibility requirements, not unique to a particular system, are included in related programs and budget requests (MCO 3093.1B para. 7d(12))					X						
- Ensure interoperability and compatibility requirements unique to a particular system or equipment are included in related program and budget documents (MCO 3093.1B para. 7b(2))		X									

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APPENDIX A

REFERENCES

- a. MCO 3093.1B, Intraoperability and Interoperability of Marine Corps Tactical Data Systems (TDSs) and Interconnecting Equipment, Draft, November 1986
- b. USMC Technical Interface Concepts, December 1984
- c. MCO P5000.10, Systems Acquisition Management Manual, 27 January 1981
- d. Marine Corps Interoperability Configuration Management Plan (Short Title: MCICMP), September 1985
- e. Chief of Staff ltr, 3000 CS, subj: Interoperability of Marine Corps Tactical Data Systems, 31 July 1984
- f. DoD Directive 4630.5, Compatibility and Interoperability of Tactical Command, Control, Communications, and Intelligence Systems, 9 October 1985
- g. Deputy SecDef Memorandum, Charter for C³ Review Council, 3 November 1983
- h. JCS Memorandum of Policy (MOP) 160, Compatibility and Interoperability of Tactical Command, Control, Communications, and Intelligence Systems, 3rd Revision, 7 January 1986
- i. DoD Directive 5154.28, Joint Tactical Command, Control, and Communications Agency (JTC³A), 5 July 1984
- j. JTC³A Circular 9000, Tactical C³I Configuration Management Plan, 13 May 1986
- k. JTC³A Circular 9002, Interoperability Certification of Tactical C³I Systems and Equipment Interfaces, 21 April 1986
- l. JTC³A Circular 9003, Joint Interoperability of Tactical Command and Control Systems, TADIL J Interface Management Plan (U), Draft, December 1985
- m. U.S. Marine Corps Command and Control Master Plan, Draft Revision, March 1987
- n. Allied Data Systems Interoperability Agency (ADSIA) ltr, RCA-C-79-85, subj: Management Plan for Improvement of NATO Command and Control Systems Interoperability, 17 June 1985
- o. ADSIA ltrs, RCA-D/3, RCA-C-152-84 and RCA-C-85-85, subj: NATO Interoperability Planning Document (NIPD), 14 June 1984, with Change 1, 21 November 1984 and Change 2, 8 July 1985

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- p. MCO 3900.4C, Marine Corps Program Initiation and Operational Requirement Documents, 10 September 1984
- q. JCS Pub 10, Tactical Command, Control and Communications Systems Standards, 1 December 1982, Volume I - JTAO Message Standard
- r. JCS Pub 12, Tactical Command and Control Planning Guidance and Procedures for Joint Operations, 1 December 1982, Volume IV - Joint Interface Operating Procedures (JIOP)
- s. JCS Pub 25, U.S. Message Text Formatting Program.
- t. Joint Standardization Group/Tactical Command, Control and Communications Systems Interface Design Handbook (IDH) C³ Systems Directorate, Organization of the Joint Chiefs of Staff (OJCS), July 1983
- u. JINTACCS Technical Interface Design Plan - Final Edition (TIDP-FE), December 1985
- v. JTIDS Technical Interface Design Plan - Test Edition (TIDP-TE), July 1982
- w. MCO 4130.5, Marine Corps Configuration Control Procedures, 28 June 1984
- x. DoDD 5010.19, Configuration Management, 1 May 1979
- y. MCO 4130.4, Marine Corps Configuration Identification Procedures for Marine Corps Configuration Items (CIs), 28 June 1984
- z. MCO 4130.7, Marine Corps Configuration Technical Reviews and Configuration Audits, 28 June 1984
- aa. MCO 5000.15, Marine Corps Systems Acquisition Management Policy, 19 February 1985
- bb. DoDD 5000.1, Major System Acquisitions, 29 March 1982
- cc. MCO 5000.11A, Testing and Evaluation of Systems and Equipment for the Marine Corps, 2 July 1979
- dd. DoDD 5000.3, Test and Evaluation, 12 March 1986
- ee. MCO 4130.1A, Configuration Management, 1 July 1974 (NOTAL)
- ff. MCO 4130.2, Configuration Management Support of Computer-Aided Tactical Systems, 17 October 1977
- gg. MCO 5711.1F, U.S. Marine Corps Procedures for Participation in the International Standardization Process, 29 April 1983
- hh. JTC³A Plan 3100, Five Year Interoperability Assurance Plan, December 1986

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APPENDIX B

GLOSSARY

TERMS/ACRONYMS

ABL	Allocated Baseline
ACAT	Acquisition Category
ACG	Acquisition Coordinating Group
ACI	Allocated Configuration Identification
ACMC	Assistant CMC
ADatP	Allied Data Publication
ADM	Acquisition Decision Memorandum
ADSLA	Allied Data Systems Interoperability Agency
ANSI	American National Standards Institute
AP	Acquisition Plan
APO	Acquisition Project Officer
APS	Acquisition Program Sponsor
ASPO	Acquisition Sponsor Project Officer
ATDL-1	Army Tactical Data Link-1
ATP	Allied Tactical Publication
BCS	Battery Computer System
BER	Bit Error Rate
BLER	Block Error Rate
BOT	Broad Operational Task
C ²	Command and Control
C ² MP	Command and Control Master Plan
C ³	Command, Control, and Communications
C ³ I	Command, Control, Communications, and Intelligence
C ³ S	Command, Control, and Communication Systems
C ⁴	Command, Control, Communications, and Computer Systems Division
CC	Configuration Control
CCB	Configuration Control Board
CDBS	Central Data Base System
CDR	Critical Design Review
CDRL	Contract Data Requirements List
CG,MCDEC	Commanding General, Marine Corps Development and Education Command
CG,MCDEC (D06)	Director Development Center
CG,MCDEC (D101)	Systems Development Branch, C ³ Division, Development Center
CI	Configuration Item
CINC	Commander-in-Chief
CINS	Common Interface Standards
CIRC	Circular
CM	Configuration Management
CMC	Commandant of the Marine Corps
CMC (CC)	Director, C ⁴ Systems Division
CMC (L)	Deputy Chief of Staff for Installations and Logistics
CMC (LM)	Deputy Chief of Staff for Installation and Logistics, Director, Material Division

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CMC (RD)	Deputy Chief of Staff for Research, Development, and Studies
CMP	Configuration Management Plan
COE	Concept of Employment
COMSEC	Communications Security
CS	Communications Equipment String
CSC	Computer Software Configuration
CSCI	Computer Software Configuration Item
DAR	Defense Acquisition Regulations
DASC	Direct Air Support Center
DC	Development Coordinator
DCS	Defense Communications System
DC/S, I&L	Deputy Chief of Staff for Installation and Logistics, HQMC
DC/S, RD&S	Deputy Chief of Staff for Research, Development, and Studies
DCT	Digital Communication Terminal
DED	Data Element Dictionary
DFI/DUI	Data Field Identifier/Data Use Identifier
DH	Developmental Handbook
DI	Data Item
DID	Data Item Description
DIR	Directive
DM/B	Developmental Manuals/Bulletins
DoD	Department of Defense
DPO	Development Project Officer
DT	Developmental Testing
DT&E	Developmental Test and Evaluation
DTP	Detailed Test Plan
ECP	Engineering Change Proposal
EIA	Electronics Industry Association
FAR	Federal Acquisition Regulations
FBL	Functional Baseline
FCA	Functional Configuration Audit
FDC	Fire Direction Center
FCI	Functional Configuration Identification
FIPS	Federal Information Processing Standards
FM	Field Manual
FMF	Fleet Marine Force
FMFM	Fleet Marine Force Manual
FO	Forward Observer
FOT&E	Follow-on Test and Evaluation
FQR	Formal Qualification Review
FSCC	Fire Support Coordination Center
FYIAP	Five Year Interoperability Assurance Plan
GFI	Government-Furnished Information
HQMC	Headquarters, Marine Corps
HWCi	Hardware Configuration Item
IAR	Interoperability Assessment Report
IC	Interface Certification
ICCB	Interoperability Configuration Control Board
ICD	Interface Control Drawing
ICP	Interoperability Change Proposal
ICWG	Interface Control Working Group
IDB	Interoperability Data Base

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IDD	Interface Design Document
IDH	Interface Design Handbook
IDS	Interface Design Specification
IER	Independent Evaluation Report
IEP	Independent Evaluation Plan
ILS	Integrated Logistics Support
ILSMT	Integrated Logistics Support Management Team
IMP	Interoperability Management Plan
IPB	Interoperability Policy Board
IPR	In-Progress Review
IRS	Interface Requirements Specifications
ISDB	Interoperability Standards Data Base
ITRG	Interoperability Technical Review Group
JARP	Joint Analysis Review Panel
JCS	Joint Chiefs of Staff
JIES	Joint Interoperability Evaluation System
JINTACCS	Joint Interoperability of Tactical Command and Control Systems
JIOP	Joint Interface Operational Procedure
JITF	Joint Interface Test Force
JITS	Joint Interface Test System
JMSNS	Justification for Major System New Start
JRMB	Joint Requirements and Management Board
JSNS	Justification for System New Start
JSOR	Joint Services Operational Requirement
JTAO	Joint Tactical Air Operations
JTC ^{3A}	Joint Tactical Command, Control, and Communications Agency
JTIDS	Joint Tactical Information Distribution System
LEM	Logistics Element Manager
MA	Mission Area
MAA	Mission Area Analysis
MAGTF	Marine Air Ground Task Force
MCDEC	Marine Corps Development and Education Command
MCICMP	Marine Corps Interoperability Configuration Management Plan
MCICS	Marine Corps Integrated Communications Support
MCO	Marine Corps Order
MCOTEA	Marine Corps Operational Test and Evaluation Activity
MCPDM	Marine Corps Program Decision Meeting
MCTSSA	Marine Corps Tactical Systems Support Activity
MED	Message Element Dictionary
MIFASS	Marine Integrated Fire and Air Support System
MLRP	Marine Corps Long Range Plan
MLRS	Marine Corps Long Range Study
MMROP	Marine Corps Mid-Range Objectives Plan
MOP	Memorandum of Policy
MPOC	Manpower Point of Contact
MTF	Message Text Format
MTS	Marine Tactical Systems
NATO	North Atlantic Treaty Organization
NCCIS	NATO Command, Control, and Information System
NCIS	NATO Common Interface Standards
NIMP	NATO Interoperability Management Plan
NIPD	NATO Interoperability Planning Document
NWP	Naval Warfare Publication
OCD	Operational Concept Document

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OJCS	Organization of the Joint Chiefs of Staff
OPFAC	Operational Facility
OT	Operational Testing
OT&E	Operational Test and Evaluation
PAT&E	Production Acceptance Test and Evaluation
PBL	Product Baseline
PCA	Physical Configuration Audit
PDA	Principal Development Activity
PDR	Preliminary Design Review
PDSSA	Post Deployment Software Support Activity
PLRS	Position Location and Reporting System
POM	Program Objective Memorandum
PPBS	Planning, Programming, and Budgeting System
PTU	Participating Test Unit
QSTAG	Quadrapartite Standardization Agreement
RAM	Reliability, Availability, Maintainability
RDT&E	Research Development Test and Evaluation
RFW/RFD	Request for Waivers/Deviations
ROC	Required Operational Capability
RQ	Regualification
RTO	Responsible Test Organization
RV	Revalidation
SDB	Systems Definition Branch
SDR	System Design Review
SECNAV	Secretary of the Navy
SLD	System Level Diagram
SOW	Statement of Work
SRR	System Requirement Review
SRS	Software Requirement Specification
SSA	Source Selection Authority
SSEP	Source Selection Evaluation Plan
SSR	Software Specification Review
STANAG	NATO Standardization Agreement
TACFIRE	Tactical Fire Direction System (ARMY)
TACS	Tactical Air Control System
TACSIIP	Tactical Systems Inter/Intraoperability Program
TADIL	Tactical Digital Information Link
TADS	Tactical Air Defense System
TAOC	Tactical Air Operations Center
TDS	Tactical Data System
T/E	Table of Equipment
TEMP	Test and Evaluation Master Plan
TIC	Technical Interface Concepts
TIDP	Technical Interface Design Plan
TIDP-FE	Technical Interface Design Plan-Final Edition
TIDP-TE	Technical Interface Design Plan-Test Edition
T/O	Table of Organization
TPD	Test Planning Document
TPOC	Training Point of Contact
TR	Test Report
TRI-TAC	Joint Tactical Communications Office
TRR	Test Readiness Review
TSP	Test Support Package
ULMS	Unit Level Message Switch

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DEFINITIONS

BASELINE: A configuration identification document or a set of such documents formally designated and fixed at a specific time during a configuration item's life cycle. Baselines, plus approved changes from those baselines, constitute the current configuration identification. (MIL-STD-480A)

CERTIFICATION: A statement, resulting from verification, that a tactical data system or interconnecting equipment has implemented the contents of its specification. (MCO 3093.1B)

CERTIFICATION TESTING: Testing that evaluates whether or not the TDS's implementation of one or more data link capabilities are technically compatible and interoperable and in accordance with standards and requirements of the appropriate documents, including the Interface Design Document (IDD), Interface Requirement Specification (IRS), or Interface Design Specification (IDS). This testing supports the interoperability certification decision and includes message, data element, protocol conformance, and system level testing. (IMP)

COMMAND AND CONTROL ARCHITECTURE: A set of associated command and control elements, called operational facilities (OPFACs), whose interaction supports the accomplishment of assigned missions. (IMP)

COMMAND AND CONTROL ELEMENT: An operational facility identified by unit, organization, command, service and country.

COMMAND AND CONTROL (C2) SYSTEM: The facilities, equipment, communications, procedures, and personnel essential to a commander for planning, directing, and controlling operations of assigned forces pursuant to the missions assigned.

COMMON INTERFACE STANDARDS (CINS): Procedural and technical interoperability standards required to improve interoperability of command, control, and information systems through the ability to exchange standard NATO messages. (NIMP)

COMMUNICATIONS EQUIPMENT STRING: Specific communications links that connect two or more C²/C³ systems/equipment that allow information to be exchanged between/among users. Note: Communications strings are certified as specific combinations of technical and/or procedural interfaces. The specific communications strings to be certified will be listed in the Five Year Interoperability Assurance Plan. (JTC³A Circ 9002)

COMPATIBILITY: Capability of two or more items or components (C² systems/equipment) to exist or function in the same system or environment without mutual interference. Emphasis is on hardware and system connectivity not on message or procedural interfaces. Systems for tactical C² are compatible with one another when necessary information can be exchanged at appropriate levels of command directly and in usable form. Equipments are compatible with one another if signals can be exchanged between them and if the equipments or systems being interconnected possess comparable performance characteristics, including suppression of undesired radiation. (JCS PUB 1)

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CONFIGURATION MANAGEMENT: A discipline applying technical and administrative direction and surveillance to (a) identify and document the functional and physical characteristics of a configuration item, (b) control changes to those characteristics and (c) record and report change processing and implementation status. (MIL-STD-480A)

DATA STANDARDS: A dictionary of common data items prescribing the manner in which these items of data are represented when specified in message and protocol standards. Data element standards are contained in NATO Allied Data Publications (ADatPs), Message Element Dictionaries (MEDs), and Data Element Dictionaries (DEDs), JCS Publications, MIL/DoD-STDs, and interface specifications. (IMP)

FORMAL QUALIFICATION REVIEW (FQR): The test, inspection, or analytical process by which a group of configuration items comprising the system are verified to have met specific contracting agency contractual performance requirements (specifications or equivalent). This review does not apply to hardware or software requirements verified at FCA for the individual configuration item. (MIL-STD-1521B)

FUNCTIONAL CONFIGURATION AUDIT (FCA): The formal examination of functional characteristics' test data for a configuration item, prior to acceptance, to verify that the item has achieved the performance specified in its functional or allocated configuration identification. (MIL-STD-1521B)

INTERFACE: A boundary or point common to two or more similar or dissimilar C² systems, subsystems, or other entities against which or at which necessary information flow takes place. (JCS PUB 1)

INTEROPERABILITY:

a. The ability of systems, units, or forces to provide services to, and accept services from, other systems, units, or forces, and to use the services so exchanged to enable them to operate effectively together.

b. The condition achieved among communications - electronics equipment when information or services can be exchanged directly and satisfactorily between them and/or their users. The degree of interoperability should be defined when referring to specific cases.

c. A general term referring collectively to both interoperability and intra-operability when a distinction between the two is unnecessary. (MCO 3093.1B)

INTRAOPERABILITY: Interoperability among Marine Corps systems. May be used when internal Marine Corps information exchange requirements are being differentiated from external or joint/combined requirements. (MCO 3093.1B)

MESSAGE STANDARDS: Message Standards are message formats, formatting rules and conventions, and acknowledgment instructions, supported by data standards. Message standards are specified in USMC, other service, and joint Technical Interface Design Plans (TIDPs), Joint Chiefs of Staff (JCS) Publications, and various North Atlantic Treaty Organization (NATO) Standardization Agreements (STANAGs). (TIDP)

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MESSAGE EXCHANGE OCCURRENCE: A unique representation indicating the sender (source node), the recipient (sink node), the link between them (circuit), and the message that transports information from one node to another. (IMP)

OPERATIONAL FACILITIES (OPFACs): Those elements specifically tasked to plan, direct, coordinate and/or control tactical operations. Each includes equipment, communications, facilities, personnel, and procedures that assist the command and control functions. OPFACs vary widely in size and complexity. Examples of an OPFAC include a fire support coordination center (FSCC), forward observer (FO), and direct air support center (DASC). (TIC)

OPFAC TASKS: Those functions performed by an OPFAC that require it to exchange information with other OPFACs. They are extracted from existing documents reflecting approved doctrine, procedures, and techniques; and contribute to the overall command and control task. Interoperability standards are selected or developed to satisfy OPFAC tasks. Mission area sponsors have the responsibility to define OPFAC tasks (TIC)

PHYSICAL CONFIGURATION AUDIT (PCA): The formal examination of the "as-built" configuration of a unit of a configuration item against its technical documentation in order to establish the item's initial product configuration identification. (MIL-STD-1521B)

PROCEDURAL INTERFACE: The methods and procedures used to establish an inter-connection within or between systems/equipment, and to transfer information within or between systems/equipment. A procedural interface equates to all protocol layers, except the physical layer, in the Marine Tactical System (MTS) Protocol Reference Model. (JTC³A Circ 9002)

PROCEDURAL INTERFACE STANDARD: A document that specifies the manner of accomplishing the exchange of C² information across an interface. It defines (a) the form or format in which information is to be exchanged, (b) the prescribed information exchange language, syntax, and vocabulary to be used in the information exchange, and (c) the interface operating procedures that govern the information exchange (JTC³A). In the USMC, procedural interface standards equate to protocol layers contained in the Marine Corps Standard Protocol Reference Model, except the physical layer, and joint message standards. (JTC³A Circ 9002)

PROTOCOL STANDARDS: The procedural rules that allow TDSs and interconnecting equipment to interchange information. They provide conventions for establishing physical transmission paths, activation and control of data links, recovery from errors, procedures for interchange of information between networks, and rules for users to interface with a data communications network. Protocol standards are those conventions and procedures that can be applied to the design and development of TDSs and interconnecting equipment to ensure their interoperability. Protocol standards are documented in DoD/MIL-STDs, the TIDP for Marine Tactical Systems, TRI-TAC performance specifications and, for Marine Corps-unique equipment, functional or product specifications, in accordance with MIL-STD-490A. (Vol V TIDP)

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REQUALIFICATION TESTING: Testing conducted to ensure that systems certified for interoperability remain so following modifications, enhancements, or system software changes. (JTC³A Circ 9002 and IMP)

REVALIDATION TESTING: Testing conducted to ensure that interface changes to other systems have not had an adverse effect on the system being tested. It is conducted on previously certified systems that have not undergone a requalification or participated in at least three other system certification, requalification, or revalidation tests within an eighteen month period for joint/combined interfaces and as determined by the Director, C⁴ Systems Division for Marine Corps TDSs. (JTC³A Circ 9002 and IMP)

TACTICAL DATA SYSTEMS: An interacting assembly of procedures, system processes, and methods which includes equipment specifically designed to collect, display, evaluate, and disseminate data for the purpose of supporting the command and control of military forces. The term specifically includes, but is not limited to:

- a. Tactical command and control systems.
- b. Tactical computer systems and equipment.
- c. Intelligence systems.
- d. Sensor systems and equipment.
- e. Communications systems and equipments.
- f. Tactical Command, Control, Communications, and Intelligence (C³I) Systems. (MCO 3093.1B)

TECHNICAL INTERFACE: A shared boundary employed in a joint/combined environment, either between a tactical data system and an external communications system, between a tactical communications system and another communications system, or between tactical communications systems. Technical interfaces equate to the physical layer protocol of the Marine Tactical System (MTS) Protocol Reference Model. (JTC³A Circ 9002)

TECHNICAL INTERFACE STANDARD: Specifications of the functional, electrical, and physical characteristics necessary to allow the exchange of information across an interface between different C³ systems or equipment. In the USMC, technical interface standards equate to the physical protocol layer contained in the Marine Corps Standard Protocol Reference Model. (JTC³A Circ 9002)

VERIFICATION: The process or act of determining or confirming that a system, piece of equipment, or an interface performs in accordance with a specification, standard, or other published document; or that a specification is in accordance with a standard and a standard in accordance with a requirement. (IMP)

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APPENDIX C

TECHNICAL REVIEW/AUDITS CHECKLISTS

	<u>YES</u>	<u>NO</u>
1. SYSTEM REQUIREMENTS REVIEW (SRR): (Ref: Appendix A, MIL-STD-1521B)		
a. <u>Mission and Requirements Analysis</u>		
(1) Does the Contractor's Mission and Requirements Analysis adequately evaluate and expand the TDS's/equipment's specified interface requirements?	___	___
(2) Has the analysis identified all implied (but unspecified) functions, sequences, and data requirements that need to be satisfied to make the system interface(s) work?	___	___
b. <u>Functional Flow Analysis</u>		
(1) Does the contractor's functional flow analysis indicate the sequential relationship of all inter-operability functions identified for each interface?	___	___
(2) Has a timeline analysis been conducted for each system interface to identify time-critical and concurrent functions?	___	___
c. <u>Preliminary Requirements Allocation</u>		
(1) Have all system interoperability requirements been appropriately allocated to hardware (interconnecting equipment or communications transmission media), firmware, software, or operator accomplishment?	___	___
(2) Is there specific traceability of all interoperability requirements; i.e., are they all accounted for?	___	___
(3) Have interconnecting equipment size, weight, power, and reliability requirements been appropriately budget for to system subcomponents?	___	___
(4) Have communications link budgets been established for bit error rates, data transmission rates, power timeliness, and reliability?	___	___

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	<u>YES</u>	<u>NO</u>
(5) Were communications link simulations performed or reviewed to predict link availability and performance?	_____	_____
(6) Have specific hardware and computer software configuration items (HWCIs and CSCIs) been identified, numbered, and documented?	_____	_____
<u>d. Trade Studies</u>		
(1) Have all system/equipment interface alternatives, identified in the functional and flow analyses, been subjected to a trade study to determine the preferred alternative?	_____	_____
(2) Did each trade study evaluate all alternatives and use appropriate criteria and criterion weighting? Was a sensitivity analysis subsequently performed on the criterion, weights, cost, estimates, and technical capability requirement(s)?	_____	_____
(3) Are the interoperability-related trade studies appropriately documented, distributed, and evaluated? Will they be available for review of potential subsequent change in interoperability requirements, concepts, and interfacing systems/equipment?	_____	_____
<u>e. System Interface Studies</u>		
(1) Has the contractor developed, and does he understand, all requirements for each system interface?	_____	_____
(a) Communications equipment?	_____	_____
(b) Interconnecting equipment?	_____	_____
(c) Various protocol requirements?	_____	_____
(d) Message requirements?	_____	_____
(e) Data element requirements?	_____	_____
(f) Staff user/operator requirements?	_____	_____
(2) If existing protocol, message, or data standards are insufficient or inadequate for selected system functions, does the contractor understand how these	_____	_____

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YES NO

new standards will be developed, tested, and standardized?

- (3) Has the contractor been provided with hardcopies (or magnetic media) of all required Marine Corps, joint, or allied standards? — —

f. Integrated Test Planning

- (1) Has the contractor taken into account all requirements for testing system/equipment interfaces:

(a) with other Marine Corps TDSs/equipment? — —

(b) with other service or allied systems? — —

- (2) Has the contractor reported all GFI/GFE needed to adequately test the system/equipment:

(a) during development? — —

(b) during DT? — —

- (3) Have special Marine Corps testing requirements, if any, been anticipated (such as certification testing)? — —

g. Configuration Management Plans

- (1) Is the contractor familiar with requirements to interact with both the system/equipment Configuration Control Board (CCB) and/or the Interoperability Configuration Control Board (ICCB), once the functional baseline has been approved? — —

- (2) Has the contractor been furnished the appropriate system/equipment CM Plan and the MCICMP? — —

- (3) Has or will the contractor submit proposed changes to the system/segment specification (SSS) as a result of his functional analysis, trade, and system interface studies? — —

h. Milestone Schedules

- (1) Do the contractor's proposed milestone schedules allow sufficient time for developmental testing of all system/equipment interface requirements? — —

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	<u>YES</u>	<u>NO</u>
(2) Does the testing schedule coincide with the contractor's requirements and requests for other interfacing GFE including TDSs/interconnecting equipment?	—	—
(3) Does the schedule provide for special interoperability testing, such as Marine Corps testing or joint certification testing?	—	—
(4) Are the required technical reviews and audits realistically scheduled?	—	—
2. SYSTEM DESIGN REVIEW (SDR): (Ref: Appendix B, MIL-STD-1521B)		
a. <u>General</u>		
(1) Have the interoperability-related deficiencies and action items identified during the SRR been addressed and resolved?	—	—
(2) Have all contractor-proposed changes to the functional baseline (as documented in the system/segment specification) been acted on by the government CCB and approved/dissapproved system sponsor?	—	—
b. <u>System/Segment Specification (SSS)</u>		
(1) Does the SSS satisfactorily address and include all functional requirements for the system/equipment interfaces?	—	—
(2) Are all pertinent, approved joint and Marine Corps interoperability standards accurately specified, either in detail or by reference?	—	—
c. <u>Preliminary Operational Concept Document (OCD)</u>		
(1) Does the preliminary OCD accurately address all system/equipment interface operations, modes, and procedures?	—	—
(2) Does the OCD address interface and communications alternatives and backup, as appropriate?	—	—

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	<u>YES</u>	<u>NO</u>
(3) Are all operator and user interactions, related to establishing and operating each interface, described?	_____	_____
(4) Are the hardware and software requirements for each system/equipment interface specified?	_____	_____
d. <u>Preliminary Software Requirements Specification(s) (SRSs)</u>		
(1) Has the software design been subdivided into appropriate and manageable CSCIs, in accordance with Appendix XVII of MIL-STD-483A?	_____	_____
(2) Are the CSCIs related to TDS/equipment interfaces appropriately titled?	_____	_____
(3) Do the SRSs accurately describe all interface requirements and relationships for each CSCI (in paragraph 3.3)?	_____	_____
(4) Does paragraph 3.3.2 (of each SRS related to an interoperability requirement) include a table that clearly identifies each CSCI-to-CSCI and CSCI-to-HWCI interface, the interface name, interfacing CI number, and document type, name, and number?	_____	_____
(5) Do the detailed interface requirements (paragraph 3.3.3) accurately specify the information exchanged over each interface (paragraph 3.3.3.1) and the protocol requirements (paragraph 3.3.3.2)?	_____	_____
(6) Does paragraph 4 clearly specify the testing required to ensure the SRS requirements are satisfied?	_____	_____
e. <u>Preliminary Interface Requirements Specification(s) (IRSs)</u>		
(1) Does the IRS (for each CSCI related to an interoperability requirement) clearly detail the data, messages, and control information passed in each direction on each CSCI interface?	_____	_____
(2) Is each data field completely described in terms of valid entries, ranges, signs, and bit positions?	_____	_____
(3) Does each message, data element, and control (protocol) implementation comply with approved TIDP standards?	_____	_____

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	<u>YES</u>	<u>NO</u>
f. <u>Other Software Development Documentation</u>		
(1) Does the contractor have a software development plan (in accordance with DI-MCCR-80030) that has been approved by the government?	___	___
(2) Does the contractor have a software configuration management plan (in accordance with DI-MCCR-80009) that reflects their organization and procedures for managing the software development configuration and design changes?	___	___
(3) Does the contractor have a software quality evaluation plan (in accordance with DI-MCCR-80010)?	___	___
(4) Has the contractor prepared a software standards and procedures manual, in accordance with DI-MCCR-80011?	___	___
g. <u>Prime/Critical Item Development Specification(s)</u>		
(1) Has the hardware design been subdivided into appropriate and manageable HWCIs, in accordance with Appendix XVII of MIL-STD-483A?	___	___
(2) Have preliminary B-level specifications (or C-level, if the SDR is for a production version of the TDS/equipment) been developed for each HWCI (associated with system interfaces and interconnecting equipment)?	___	___
(3) Have these specifications been prepared in accordance with MIL-STD-490A? (Note: appendices II, III, and IV apply for B-level specifications; appendices VII, VIII, IX, X, XI, and XII for C-level.)	___	___
(4) Do these specifications accurately identify all equipment and hardware-to-software interfaces?	___	___
(5) Do the quality assurance provisions (section 4) specify appropriate interoperability testing requirements for each HWCI?	___	___
h. <u>Risk Analysis and Management</u>		
(1) Has the contractor identified all risks (technical, performance, cost, and schedule) related to TDS/equipment interoperability achievement?	___	___

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	<u>YES</u>	<u>NO</u>
(2) Has the contractor accurately assessed these interoperability risks and planned appropriate risk abatement activities for medium and high risk areas?	_____	_____
(3) Based on the above SDR results, are the TDS/equipment program costs and milestones (related to interoperability achievement) still valid?	_____	_____
3. SOFTWARE SPECIFICATION REVIEW (SSR): (Ref: Appendix C, MIL-STD-1521B)		
a. <u>General</u>		
(1) Have all the software interoperability-related deficiencies and action items identified during the SCR been addressed and resolved?	_____	_____
(2) Have the requirements of 2c, d, and e been satisfactorily met?	_____	_____
(3) Have the following documents been updated and submitted for final government approval?		
(a) Software Development Plan?	_____	_____
(b) Software Configuration Management Plan?	_____	_____
(c) Software Quality Evaluation Plan?	_____	_____
(d) Software Standards and Procedures Manual?	_____	_____
b. <u>Operational Concept Document (OCD)</u>		
(1) Has the OCD been updated to incorporate prior government comments?	_____	_____
(2) Does the OCD now correctly identify all mission requirements of the system and its various associated operational and support environments?	_____	_____
(3) Are the functions and characteristics of the computer system(s) within the overall system properly described and related?	_____	_____

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	<u>YES</u>	<u>NO</u>
c. <u>Software Requirements Specification(s) (SRSs)</u>		
(1) Do the SRSs (for interoperability-related CSCIs) properly translate the software functional requirements of the SSS into performance requirements, including execution, response and/or throughput times, and memory storage constraints?	___	___
(2) Are all CSCI inputs, processing requirements, and outputs specified in detail?	___	___
(3) Are both control and data flow shown for the CSCI?	___	___
(4) Do the qualification requirements identify the levels and methods of testing for all the CSCI's functional and performance requirements?	___	___
(5) Are the other quality requirements appropriately specified?	___	___
d. <u>Interface Requirements Specification(s) (IRSs)</u>		
(1) Do the IRSs still comply with the approved TIDP in terms of the protocols, messages, and data elements specified?	___	___
(2) Have any new messages or data elements been identified for use on external system interfaces? Have ICPs been submitted to obtain approval and incorporation into the TIDP?	___	___
e. <u>Allocated Baseline</u>		
(1) Are the OCD and the interoperability-related SRSs/IRSs sufficiently complete and correct for government approval (as the allocated baseline)?	___	___
(2) Are the procedures for subsequent change proposal, review, and approval fully detailed in both the government and contractor CM plans? Are they understood by all concerned?	___	___

INTEROPERABILITY MANAGEMENT PLAN

YES

NO

4. PRELIMINARY DESIGN REVIEW (PDR): (Ref: Appendix D, MIL-STD-1521B)

NOTE: The referenced appendix contains numerous pages of detailed technical items to be reviewed during the TDS/equipment PDR. The following are intended to supplement the reference and emphasize special interoperability concerns.

a. Design Documentation

(1) Is the interconnecting equipment design accurately documented in layout and interface control drawings, functional flows, requirements allocation sheets, and schematic diagrams? _____

(2) Do the Software Top-Level Design Documents (STLDDs), preliminary Software Detailed Design Documents (SDDDs), Interface Design Documents (IDDs), and Data Base Design Documents (DBDDs) for those CSCIs associated with TDS/equipment interfaces accurately reflect all interface requirements, including interoperability functions, standards implementation, and performance requirements? _____

b. Security. Has security engineering been applied to each of the interfaces and their hardware/firmware/software components? _____

c. Cost. Does the system/equipment Life Cycle Cost Analysis take into account the cost of maintaining interoperability with changing equipment, systems, and standards? _____

d. Testing

(1) Do the HWCi and Software Test Plans reflect all interoperability testing requirements? _____

(2) Have the Government-Furnished Equipment (GFE) requirements been updated or revalidated to meet all TDS/equipment test requirements? _____

5. CRITICAL DESIGN REVIEW (CDR): (Ref: Appendix E, MIL-STD-1521B)

NOTE: The referenced appendix contains numerous pages of detailed technical items to be reviewed during the TDS/equipment PDR. The following are intended to supplement the reference and emphasize special interoperability concerns.

INTEROPERABILITY MANAGEMENT PLAN

	<u>YES</u>	<u>NO</u>
a. <u>Design Deficiencies/Shortcomings.</u> Have all interoperability-related design deficiencies and shortcomings identified during the PDR(s) been satisfactorily corrected or resolved?	_____	_____
b. <u>Draft Product Specifications</u>		
(1) Have all interconnecting equipment draft product specifications been submitted for government review?	_____	_____
(2) Have all Software Product Specifications (SPSs) and their component design documents (related to TDS/equipment interoperability) been submitted for government review?	_____	_____
c. <u>Test Deficiencies.</u> Have all HWCI and Software Test Plan deficiencies noted during PDR been satisfactorily corrected or resolved?	_____	_____
d. <u>Other Documentation.</u> Do the preliminary Computer System Operator's Manual (CSOM) and Software User's Manual adequately address for all operator and end-user procedures for initiating and maintaining TDS/equipment interfaces and using or generating messages?	_____	_____
6. TEST READINESS REVIEW (TRR): (Ref: Appendix F, MIL-STD-1521B)		
a. <u>Requirement Changes</u>		
(1) Are there any approved changes to the software requirements specification that impact interoperability testing?	_____	_____
(2) Are there any approved changes to the interface requirements specification that impact interoperability testing or the specified functions of the interface?	_____	_____
b. <u>Design Changes</u>		
(1) Are there changes to the software top-level design document, software detailed design document, data base design document or inter face design documents that will impact interoperability testing?	_____	_____

INTEROPERABILITY MANAGEMENT PLAN

	<u>YES</u>	<u>NO</u>
(2) Have all changes to the design documents been reviewed to ensure all interoperability requirements are met?	_____	_____
c. <u>Software Testing</u>		
(1) Are approved software changes that affect interoperability included in the software test plans and software test descriptions?	_____	_____
(2) Do the software test procedures include provisions for testing interoperability requirements?	_____	_____
(3) Are interoperability requirements included in retest procedures?	_____	_____
(4) Are software test resources (hardware, test software, tools, etc.) included in test plans?	_____	_____
(5) Do any known software problems or test limitations exist?	_____	_____
d. <u>Milestones</u>		
(1) Do the contractor's milestones allow for adequate software testing for all TDS/equipment and interfaces?	_____	_____
(2) Are remaining milestones realistic and provide sufficient time for special Marine Corps interoperability testing, if required?	_____	_____
7. FUNCTIONAL CONFIGURATION AUDIT (FCA): (Ref: Appendix G, MIL-STD-1521B)		
a. Do the contractor's test plans, specifications, and reports address the interoperability requirements?	_____	_____
b. Do the completed functional test reports contain test data on the testing and results of interoperability requirements testing?	_____	_____
c. If interoperability requirements need to be tested, are those tests included in the list of functional tests still to be performed?	_____	_____

INTEROPERABILITY MANAGEMENT PLAN

	<u>YES</u>	<u>NO</u>
d. Do retest plans include any testing of interoperability requirements that did not successfully pass earlier testing?	_____	_____
e. Have all previous items in the PDR and CDR been satisfactorily addressed?	_____	_____
f. Do the contractor's test reports reflect the results of interoperability testing performed?	_____	_____
g. Are interoperability standards included in the software product specification?	_____	_____
8. PHYSICAL CONFIGURATION AUDIT (PCA): Ref: Appendix H, MIL-STD-1521B)		
a. Do acceptance test procedures and test data include information on interoperability requirements?	_____	_____
b. Does the current, approved hardware development specification and interface requirement specification include interoperability requirements?	_____	_____
c. Do the contractor's test reports reflect the results of interoperability testing performed?	_____	_____
d. Are interoperability standards included in the software product specification?	_____	_____
9. FORMAL QUALIFICATION REVIEW (FQR): (Ref: Appendix I, MIL-STD-1521B)		
a. Does the actual performance of the equipment meet the stated interoperability requirements?	_____	_____
b. Do the test reports verify that equipment meets stated interoperability requirements?	_____	_____
c. Do the hardware development specifications, software requirements, and interface requirements specifications address the stated interoperability requirements?	_____	_____
d. Does the test report data reflect that interoperability standards have been successfully tested and are as reflected in the software requirements and interface requirements specifications?	_____	_____

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YES

NO

- e. Have interoperability requirements been addressed and successfully tested in any systems testing?

INTEROPERABILITY MANAGEMENT PLAN

APPENDIX D

INTEROPERABILITY TEST DOCUMENT CHECKLISTS

A. <u>TEST AND EVALUATION MASTER PLAN (TEMP)</u> : (Ref: DoDD 5000.3 Enclosure 2)	<u>YES</u>	<u>NO</u>
(1) Does Part I, para 1, Mission, include the inter- operability requirements contained in the ROC, Mission Area Analysis, Justification for Major System New Start (JMSNs) or Justification for System New Start (JSNs)?	___	___
(2) Does Part I, para 2b contain information on required interfaces with other systems?	___	___
(3) Does Part I, para 3 and 4 list the key interoperability operational and technical characteristics? Are the key characteristics the same as those defined and discussed at program milestone reviews?	___	___
(4) Does Part I, para 5 address critical interoperability test issues?	___	___
(5) Does Part II, Program Summary, allow for sufficient testing of interoperability requirements?	___	___
(6) Does Part III, DT&E Outline, identify interoperability requirements and methods of testing (simulations, brassboard, etc.)? Are interoperability requirements included in test scenario? Are critical DT&E items identified?	___	___
(7) Does Part IV, OT&E Outline, address interoperability test requirements and objectives? Are critical interoperability test items identified? Are interoperability test requirements included in test scenario?	___	___
(8) Does Part VI, Special Resources Summary, address any special interoperability testing requirements such as test equipment, systems, etc.?	___	___
B. <u>TEST PLANNING DOCUMENT (TPD)</u> : (Ref: MCO 5000.11A Enclosure 3)		
(1) Does para 3, Objectives/Operational Issues, include interoperability requirements as defined in ROC, Work Directive, etc.?	___	___

INTEROPERABILITY MANAGEMENT PLAN

INTEROPERABILITY TEST DOCUMENT CHECKLISTS (Cont'd)

	<u>YES</u>	<u>NO</u>
(2) Does para 4, Test Concept, address interoperability test concept for Marine Corps and/or joint systems?	___	___
(3) Does para 5, Test Resource Requirements, include test equipment, personnel required for interoperability testing?	___	___
C. <u>DETAILED TEST PLAN (DTP):</u> (Ref: MCO 5000.11A Enclosure 4)		
(1) Does para 2b contain information on any significant interoperability testing previously accomplished by a contractor or the government?	___	___
(2) Does para 2d, Test Objectives, contain interoperability test objectives and evaluation criteria as derived from work directive? Are critical interoperability issues listed as stated in TPD or TEMP?	___ ___	___ ___
(3) Does para 2e, Test Concept, contain an interoperability test concept as part of the overall test concept? Are provisions for communications protocols data collection included in the data collection plan?	___ ___	___ ___
(4) Does para 2g, Test Organization/Support, contain key interoperability test personnel?	___	___
(5) Does para 2h, Instrumentation, contain a list of required communications protocol test equipment?	___	___
(6) Does para 2j, Training, address special interoperability training requirements, if any?	___	___
(7) Does Annex A, Concept of Operations, include functional relationships with other systems?	___	___
(8) Does Annex B, Scenario, include requirements for interoperability testing (e.g., timeliness and accuracy of messages, etc.)?	___	___
(9) Does Annex C, Test Design, include provisions for use of simulations for interoperability testing? Does it address interaction between systems?	___ ___	___ ___

INTEROPERABILITY MANAGEMENT PLAN

INTEROPERABILITY TEST DOCUMENT CHECKLISTS (Cont'd)

	<u>YES</u>	<u>NO</u>
D. <u>TEST REPORT (TR)</u> : (Ref: MCO 5000.11A Enclosure 5)		
(1) Does para 2d, Objectives, contain a statement of inter- operability objectives from the DTP?	_____	_____
(2) Does para 2g, Test Results, address the achievement of interoperability in both development and operational testing?	_____	_____
(3) Does Appendix A, Test Data, reflect interoperability test results?	_____	_____
(4) Does Appendix B, Test Criteria and Issues, address inter- operability test criteria and issues for the test?	_____	_____
(5) Does Appendix C, Deficiencies and Suggested Improvements, address interoperability deficiencies and shortcomings? Are recommendations for improvement contained in the annex?	_____	_____
E. <u>INDEPENDENT EVALUATION REPORT (IER)</u> : (Ref: MCO 5000.11A Enclosure 6)		
(1) Does para 2b(3), Intended Operational Capability, contain interoperability requirements needed for Marine Corps/joint operation?	_____	_____
(2) Does para 2c, Adequacy of Operational Testing, identify interoperability requirements/interface testing from which sufficient test data was obtained?	_____	_____
(3) Does para 2h, Evaluation of Operational Issues, contain interoperability issues, evaluation criteria, and test results?	_____	_____
(4) Does para 2j, Overall Conclusions, address interoperability achievement/implementation?	_____	_____
(5) Does para 2k, Recommendations, include an interoperability recommendation, based upon the conclusions contained in para 2j?	_____	_____

INTEROPERABILITY MANAGEMENT PLAN

APPENDIX E

FYIAP SUBMISSION FORMAT

VOLUME I: TEST REQUIREMENTS

1. FYIAP Submission Number: (To be assigned by JTC³A Fiscal Year - Submitting S/A/C - T (Technical) or P (Procedural)).
2. Submitting Agency: DoD Component submitting initial request (subcomponent may also be identified).
3. Source: Source document(s) and dates of publications that identify the requirement(s) for the interface that is to be tested or certified (NA = Not Available)
4. Test Type:
 - Technical (Tech): Use one or more of the following: Interface Certification (IC), Preliminary Interface Certification (PIC), Communication String (CS), Follow-on Test and Evaluation (FOTE), Operational Test and Evaluation (OT&E), Production Acceptance Test and Evaluation (PATE), Development Test and Evaluation (DTE), Operational Exercise (OE).
 - Procedural (Proc): Interface Certification (IC), Requalification (RQ), Revalidation (RV), Developmental Certification Test (DCT).
5. Test Scope: This entry will cover the overall scope of the test and should include the following as a minimum:
 - a. Environment: Outline the environment in which the test must be conducted (desert, over water, mountain, etc.)
 - b. Operational Setting: Outline the deployment and employment scenarios planned for the test.

INTEROPERABILITY MANAGEMENT PLAN

- c. Threat: Outline how the threat will be simulated during the test to verify countermeasure design.
6. Short Title: A succinct title for the test that is described in item 7, description of the interface.
7. Description of Interface:
 - a. Equipment: List equipment(s)/system(s) to be interfaced and/or certified, requalified, or revalidated.
 - b. Test Objective(s): A statement of objectives to be attained/clarified and the types of traffic to be passed through the interface(s) under test.
 - c. Technical Details: Provide a diagram or narrative of the equipment(s) or system(s) comprising the interface(s); e.g., show C2 and/or terminal and switching equipments as applicable, leased lines, cable systems, radio links, satellite links, numbers and type of requested circuits with their load, etc.
8. Date Required: Certification date or other test date, e.g., when testing is required.
9. Requirements Point(s) of Contact: Indicates the name(s), telephone number(s) and organizational element of the individual(s) most knowledgeable of the requirement details.

NOTE: Care should be taken to properly classify submissions where any of the required details are classified - indicate those details which are classified

INTEROPERABILITY MANAGEMENT PLAN

FYIAP SUBMISSION FORMAT

VOLUME II: RESOURCE REQUIREMENTS FOR TECHNICAL INTERFACES

1. Responsible Test Organization: Indicate the organization that should be responsible for test planning and conduct of the test, i.e. MCTSSA, Camp Pendleton, CA.
2. Supporting Organizations: List all organizations that are planned to support the test; e.g., Joint Test Element (JTE), Fort Huachuca, AZ, Naval Oceans Systems Center (NOSC), San Diego, CA, Marine Corps Development and Education Command (MCDEC), Quantico, VA.
3. Resources: This entry may be narrative in nature and should break out anticipated resource requirements. The following should be addressed as a minimum.
 - a. Equipment/Source: Indicate the equipment required and, when possible, its source.
 - b. Facility Requirements: Indicate unique test facility requirements, any type of technical or engineering support required (Government or Contractor) and, when possible, its source.
 - c. Manpower Requirements: Indicate anticipated manpower requirements (operators, maintainers, contractor support, etc.)
 - d. Funding: Indicate projected costs to conduct the test.

(The above information will provide the basis for development of Section 1-4, Volume II, Test Resource Requirements, of the FYIAP)

INTEROPERABILITY MANAGEMENT PLAN

4. Test Location(s): Indicate location or recommend location where test should be centrally managed and include (where applicable) the location for equipment provided by participating units that will not be located at the central management facility.
5. Test Schedule: Indicate the major milestones, corresponding responsible activity, and desired certification date (if applicable). The schedule of events and dates should be those that will be further supplemented in the appropriate test plan.
6. Point of Contact: Indicate the name, telephone number, message address, and complete mailing address of the individual(s) responsible for test planning.

NOTE: Care should be taken to appropriately classify submissions where any of the required details are classified - indicate those details which are classified.

INTEROPERABILITY MANAGEMENT PLAN

FYIAP SUBMISSION FORMAT

VOLUME II: RESOURCE REQUIREMENTS FOR PROCEDURAL INTERFACES

1. Responsible Test Organization: JITF
2. Supporting Organizations: List all organizations that are planned to support the test; e.g., Joint Test Element (JTE), Fort Huachuca, AZ, Naval Oceans Systems Center (NOSC), San Diego, CA, Marine Corps Development and Education Command (MCDEC), Quantico, VA.
3. Resources: This entry may be narrative in nature and should break out anticipated resource requirements. The following should be addressed as a minimum.
 - a. Equipment/Source: Test beds: List JIES, JITS, or MTF. Indicate the equipment required and, when possible, its source.
 - b. Facility Requirements: Indicate unique test facility requirements, any type of technical or engineering support required (Government or Contractor) and, when possible, its source.
 - c. Manpower Requirements: Indicate anticipated manpower requirements (operators, maintainers, contractor support, etc.)
 - d. Funding: Indicate projected costs to conduct the test.

(The above information will provide the basis for development of Section 1-4, Volume II, Test Resource Requirements, of the FYIAP)

INTEROPERABILITY MANAGEMENT PLAN

4. Test Location(s): Indicate location or recommend location where test should be centrally managed and include (where applicable) the location for equipment provided by participating units that will not be located at the central management facility.
5. Test Schedule: Indicate the major milestones, corresponding responsible activity, test start date, and desired certification date (if applicable). The schedule of events and dates should be those that will be further supplemented in the appropriate test plan.
6. Point of Contact: Indicate the name, telephone number, message address and complete mailing address of the individual(s) responsible for test planning.

NOTE: Care should be taken to appropriately classify submissions where any of the required details are classified - indicate those details that are classified.



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